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OBSERVATIONS ON MALARIA.*

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This paper is to bring to you a report of some local observations on a disease in which we are all interested, in which the people of all Southern States are interested—malaria. It is based on a study of our work in Western Mississippi covering a period of seven years, 1919 to 1926, inclusive.

PREVALENCE.

To read statistics based on the number of cases of malaria reported by the doctors of Mississippi, a stranger would easily be led to believe that our State was overrun with this disease—that everyone had to have it sooner or later. For the period of this report the doctors of Mississippi reported to the State Board of Health 376,807 cases of malaria in whites; 399,751 cases in negroes—a total of 776,558 cases in this State in seven years. It is easy to see the deterrent effect of such statistics on prospective settlers or visitors in Mississippi at a time when everyone is putting forth every effort to bring people to Mississippi to build up our State. It is also easy to see that these statistics do not indicate the true prevalence of malaria.

In our work, we have made a careful study of the blood for malaria in every hospital and clinic patient, without regard to symptoms. In addition, blood smears have been received from the doctors of the surrounding territory and these have also been examined for the presence of parasites. In the seven-year period covered by this report, the State Board statistics for Warren County, which is fairly representative of the territory covered by our report, show that physicians reported 6,342 cases of malaria in whites and 7,461 cases in negroes—a total of 13,803 cases diagnosed as malaria. In this period we actually found malarial parasites 177 times in 13,034 examinations, or 1.36 per cent. This does not seem to bear out statistics.

In a communication from Dr. T. W. Kemmerer, Director of the State Hygienic Laboratory, it is shown that in the seven-year period from July 1, 1919, to June 30, 1926, malaria was found 1,314 times in 27,673 examinations. And while this record does not show all blood examinations, but only those sent in to be examined for malaria, those in which malaria was apparently suspected, and those sent in for other examinations in which malarial organisms were found, the percentage of positive findings is only 4.39 per cent.

I realize that in our work we are open to the objection that we are not finding the parasites when malaria actually exists, either due to previous treatment which has driven the parasites from the surface blood or faulty technic of our own. Both could cause failure. On the other hand Wootton,[1] writing in the Southern Medical Journal, reported as a result of a questionnaire sent to representative practitioners of the South that those men replying expected to find the parasites in the blood in the acute

*Read before Mississippi State Medical Association, Jackson, May 10-12, 1927.

stage of untreated malaria in 50 to 100 per cent of all cases, one-third placing it at 100 per cent. In chronic malaria, a small per cent stated that they expected 100 per cent positive findings; an equal per cent expected 10 per cent positive findings, and the majority placed expected positive findings evenly scattered between these two extremes.

Judging from the opinions of these men, and provided our examinations were of average accuracy, we should have found 50 per cent or more of the actual cases of malaria by blood examination. Admitting that we may have missed the other 50 per cent, our positive findings would not go over three per cent of all cases examined, which figure still shows an incidence much lower than statistics for this State would indicate.

PERIODICITY.

Our studies show the year divided into periods as regards the prevalence of malaria—an epidemic period from June to August with the tertian type predominating; an epidemic period from September to November with the aestivo-autumnal type predominating; a winter recurrence period with the aestivo-autumnal type predomnating, and a spring recurrence period with the tertian type predominating. The recurrent cases apparently form 16.38 per cent of all infections. These periods are shown graphically below:

PREVALENCE BY MONTHS.

TABLE I.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Tot.
Aestivo-autumnal	3	1	1	1	0	3	5	3	13	28	11	2	71
Tertian	0	2	1	4	13	19	18	20	8	12	8	1	106
Totals	3	3	2	5	13	22	23	23	21	40	19	3	177

MALARIA IN NEGROES.

It has been said that negroes have some natural immunity to malaria and this appears probable in this series, although statistics for the State and for Warren County show malaria predominating in negroes. We found 12.99 per cent of all cases in negroes (23 cases). Of these, the infection was of the aestivo-autumnal type in 13 cases and tertian in 10.

MALARIA IN CHILDREN.

We hear much about the prevalence of malaria in children, perhaps because much of the malarial survey work has been done with school children. In this series, 14 cases (7.91 per cent.) only were found in children. The tertian type was predominant with 12 cases to two of aestivo-autumnal. Deaderick[2] in Nelson's Medicine states that children are more frequently and more severely afflicted than adults.

SEX.

Deaderick[2] also says, "As a general rule, females are less often attacked with malaria than males." Our findings bear this out with 100 positive findings in males and 77 in females. The proportion of aestivo-autumnal infections is slightly higher in females being 44.16 per cent to 55.84 per cent tertian as against 37.0 per cent aestivo-autumnal to 63.0 per cent tertian infections in males.

Of the total number of positive findings in this series, 71 or 40.11 per cent were aestivo-autumnal and 106 or 59.89 per cent were tertian.

TOTAL LEUKOCYTE AND DIFFERENTIAL LEUKOCYTE COUNTS.

Much has been written about total leukocyte counts and differential leukocyte counts in malaria, some observers having gone so far as to state that a diagnosis could be made from these examinations in the absence of positive findings. The most common claims are that the total leukocyte count is diminished in malaria—that there is a leukopenia, and that the percentage of large mononuclear leukocytes is increased.

Three years ago by a careful review of something over 3,000 total leukocyte and differential counts obtained in our work in this locality, we came to the conclusion that the average normal standards for this locality were as follows: Total leukocyte count, 7,000 to 8,000; differential count: small mononuclears, 31 per cent; large mononuclears, 7 per cent; polymorphonuclear neutrophiles, 62 per cent; eosinophiles, 1 per cent; basophiles, 0.1 per cent.[3]

In this series of positive malaria findings, we have found average leukocyte and differential leukocyte counts as follows:

PREVALENCE BY MONTHS.

TABLE II.

Total Leukocyte and Differential Leukocyte Counts in Malaria.

	Normal	Aestivo-Autumnal	Tertian
Total leukocytes	7,000 to 8,000	8,107	7,587
Small monon.	30.60%	24.2%	27.1%
Large monon.	6.50	10.1	8.5
Polym. neutr.	61.85	65.0	63.5
Polym. eosin.	0.95	0.5	0.7
Polym. basoph.	0.10	0.2	0.2

It will be noted that in this series at least there is no leukopenia. Rather the total leukocyte counts are slightly above or within the limits we consider normal. The large mononuclear leukocytes are moderately increased, this being the most characteristic finding in the study of the leukocytes in malaria, and in accordance with the statement of Bass[4] in Tice's Practice of Medicine, "The only change in the leukocyte count is an increase in the percentage of the large mononuclear cells."

CONCLUSIONS.

1. These studies indicate that the prevalence of malaria in this section of the country is much lower than statistics would seem to indicate.

2. The year is apparently divided into epidemic and recurrence periods, with the tertian infections somewhat in excess of the aestivo-autumnal.

3. There are apparently fewer cases of malaria in negroes than in whites, with aestivo-autumnal infections slightly predominant.

4. There are apparently fewer cases in children than in adults, and tertian infection predominates.

5. More malaria infections are found in males than in females. The tertian type is more frequent in both. The proportion of aestivo-autumnal infections to tertian infections is slightly higher in females.

6. Of the total number of infections, there are more tertian infections than aestivo-autumnal infections.

7. These studies indicate that the total leukocyte count is not diminished in malaria, and is slightly higher in aestivo-autumnal infections than in tertian infections.

8. These studies indicate that the large mononuclear percentage is increased in malaria and that this increase is slightly more marked in aestivo-autumnal infections than in tertian infections.

One idea in closing—While Wootton[1] quotes 50 per cent of the representative practitioners of the South who replied to his questionnaire as considering a clinical diagnosis of malaria justifiable, should we not be a little more careful in our reports to the State Board of Health, that we do not include as malaria a large number of cases that may not be malaria at all? Should we not bear in mind that when we report a case as malaria, that that is only the beginning of the harm it may cause? State Board statistics, made up from our reports, are broadcast, and while one incorrect report of malaria from one doctor seems little, one incorrect report of malaria from each doctor in the State makes an impressive list, especially to those outside our State who are considering coming to Mississippi to make their homes and help us to grow.

BIBLIOGRAPHY.

1. Wootton, W. T.: The Family Physician vs. The Laboratory Diagnosis of Malaria. South. M. J., 18:116, 1925.

2. Deaderick, W. H.: Malaria, in Nelson Loose Leaf Medicine, 2:241-242, New York, Thomas Nelson & Sons, 1922.

3. Lippincott, L. S.: Blood Counts in Mississippi, J. Lab. & Clin. Med., 11:529, 1926.

4. Bass, C. C.: Malaria, in Tice, Practice of Medicine, 3:597, Hagerstown, Md., W. F. Prior Co., 1927.

VISCERAL PAIN.*

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The following extract appeared in one of our medical journals of recent date, from a prominent surgeon of a neighboring state:

"The community is not being rendered prompt and efficient medical care in the very cases in which it is of utmost importance. Such cases as are ordinarily regarded as amenable to medical and surgical skill are succumbing in great numbers.

"It is generally agreed that the mortality in a certain group of cases is too high; why then, has the mortality in these classes of cases not been materially reduced? Of several reasons which may be advanced there is one upon which all are agreed, viz., the failure to recognize and send such cases to the hospital in the earliest stages when medical and surgical measures would accomplish most.

"It is recognized that the remedy lies in the education of the general practitioner in their early recognition."

To quote from a paper read before this association last year by Dr. Bryan of Nashville: "We must admit the fact that most people who die before their time nowadays die because competent search for the cause of their trouble has not been made, or because improper treatment has been administered before the cause of trouble has been found."

To quote Dr. Bryan further: "Diagnosis is the most difficult thing in medicine. Geography even enters into it, climate, country, nationality, race, and the nearer things personal and family history, employment, and mode of living, habits of travel, personal habits of eating and drinking, then comes his anatomy, physiology, chemistry physical state, appearance, locomotion, strength, physical signs, symptoms. The laboratory findings: chemical, pathological, X-ray, biological, electrical. When all these have been inquired into, all that the merits of the case in hand warrant, the diagnostician must combine them in such a way as to arrive at a warranted conclusion." And Dr. Martin of New Orleans in an address before our Delta Counties Medical Association, on the importance of having a complete record of cases, stressing the importance of a thorough physical examination, stated that after all, clinical findings are worth all the rest: i. e., laboratory findings, chemical, pathological, X-ray, biological, electrical, etc.

The important point is, then, that the general practitioner in the small towns who has not access to laboratories where all these tests can be made should study to make early and accurate diagnosis through the use of his five senses unaided by laboratories. More failures in diagnosis come from imperfect examinations than from ignorance.

In spite of all of the refinements of modern diagnosis, pain remains the most frequent and important single subjective symptom of disease, and its correct interpretation is the greatest essential in successful diagnosis. While the sensation of pain is itself a purely subjective phenomenon, there are a number of objective points of interest associated with it, which in clinical practice, render it almost in the nature of an objective symptom. Often, for example, it has to be elicited by pressure or some form of stimulation applied by the physician.

The question of the precise nature of the pain, where and at what time it is experienced, are important factors; and, in short, however subjective the symptoms may be from the standpoint of the patient, its interpretation always presents to the physician a problem of objective diagnosis.

From a physiological standpoint there are two distinct types of pain which must be reckoned with, in diagnosis and therapy; they have been termed respectively—

*Read before Mississippi State Medical Association, Jackson, May 10-12.

organic and functional pain; organic pain is that which has its origin in the domain of the organic or sympathetic nervous system. Pain which arises in the viscera, in unstriped muscle, such as the bladder, uterus or in the trunk of the nerves themselves, mediated through the sympathetic ganglia, is of this type. Clinically, such forms of pain are recognized by certain characteristics which indicate their seat; as, periodic pain in the unstriped muscle organs, rhythmic pain depending upon vascular function; boring stabbing pain in the nerve trunks or sheath; tension pain due to stretching of visceral capsules. All of these pains are more or less constant, regular and deep seated, as one would expect of the sympathetic nervous system, which is itself regular and automatic in its behavior.

Functional pain is that which originates in the realm of the cerebro-spinal system, such as occur from disordered function, or from abnormal or excessive stimulation of the cerebro-spinal nerves; being mediated so far as the nerves are concerned, in the normal fashion, from periphery to center.

Of all the forms of pain encountered in medicine, visceral pain offers, perhaps, the most perplexing of such quasi-objective problems, partly because the viscera are inaccessible to direct inspection, or touch, and partly by reason of certain peculiar anatomical and physiological conditions which are well known to all medical men. For the same reason there are no structures of the body in which we are obliged to depend so largely on pain for the early detection and diagnosis of diseases as these same visceral organs. Anything, therefore, which tends to shed light upon the recognition of, and interpretation of, visceral pain would seem to be of interest and help to the physician in his daily practice.

All viscera are hollow organs whose function is to hold, and presently to expel their contents; they are essentially muscular organs with an involuntary muscle function. Their normal stimuli are those which bring about muscle contraction and to them and them alone they respond. By the same token, it is excessive muscle stimuli, or muscle stimuli under pathological conditions which produce visceral pain. This simple physiological truth, and its application to pathology, is borne out by the obvious fact that visceral pain, i. e., the painful sensory elements which are referred to the viscus itself, are in their nature, exaggerations of the sensations normally felt in the same viscera. In fact, the one common factor present in all cases of visceral pain is an increase of intra-visceral pressure and muscular tension.

There is a sensory element associated with visceral disease which is not felt in the viscus itself, but is referred to a body area in accordance with Head's law. There is a pathological element in visceral disease which does not manifest itself in either abnormal distention or in painful reaction to normal tension. This is a state of congestion and inflammation, which affects the parenchyma of the organ and attacks its muscular tissues, and to which the viscus itself is not sensorially responsive. It is logical to conclude that it is this inflammatory element which causes pain, referred by the spinal cord to definitely outlined body areas. Ryle sums the matter up in the following statement:—"(a) Visceral pain is due to an abnormal increase in the tension of the muscular element of the wall of the viscus, resulting either from contraction, or from failure to relax on the part of the muscle fiber in the presence of increased intra-visceral pressure. This visceral pain when occurring alone, or dissociable from attendant body pain, may be accurately localized by the patient. (b) Referred body pain and tenderness more frequently expresses an inflammatory lesion of the viscus. This gives us a useful principle of differentiation between the two types of visceral disease based upon the nature and location of the pain."

True visceral pains are in the organ itself and when they are non-inflammatory

are seldom accompanied by reflected superficial pain or soreness. In purely inflammatory visceral lesions, on the other hand, referred body pain or tenderness is observed in the absence of local visceral pain. When both forms of pain occur, the logical conclusion is that both types of pathology co-exist.

The principal value of symptom is to give us a knowledge of the diseased condition we are called upon to treat, and pain is the most important of all symptoms. Again and again we have to base our diagnosis on the patient's own story and in this story the element of pain always occupies a prominent place. It is evident then, that a proper evaluation of pain is an essential factor in diagnosis. Thus the necessity of studying pain as a sympton is but another term for the importance of careful clinical inquiry.

Dr. Bryan asks the question: "Are we diagnosing acute abdominal pain as well as we might, are we prescribing for it over the phone without having seen the patient?" The most important thing about the study of pain is the necessity of seeing the patient when the pain is actually present. The patient's statement as to the nature of pain, and certain "gestures" which they make in indicating the seat of their pain are important. But the more personal the observation we are able to make about pain the more correctly we are able to interpret it. A systematical examination of our patient should never be omitted.

Ryle has suggested the following questions to be asked ourselves as well as the patient, in regard to visceral pain:

(1) The situation.
(2) The extent of diffusion.
(3) The character.
(4) The severity.
(5) The duration.
(6) The frequency.
(7) The aggravating factors.
(8) The relieving factors.

Martinet: "Clinical Diagnosis and Symptoms" divides the abdomen for the study of the viscera into five segments; epigastrium, right and left hypochondria, right and left iliac fossae. To go into the study of the numerous pains occurring in these regions would require more time than I am alloted, even were I capable of such. However, we will take up briefly a few of the diseases of which "so many are dying before their time" because—as suggested by the two eminent men quoted in the outset—of the failure of the general practitioner to make an early diagnosis and institute or have instituted the proper treatment.

Gall-bladder and bile duct pain: Pain in the right hypochondrium. Martinet says that four-fifths of all pain disturbances in this region originate in the liver or gall-bladder.

The true visceral pain of gall-bladder disease, especially of gall-stones, is so characteristically one of muscular tension and so dramatically relieved by the passage of the stone as to be perfectly evident to the patient himself. Of all the visceral pains it is the one most described by the patient. Acute, paroxysmal colicky pains are especially characteristic of cholelithiasis—jaundice occurs in about one-fourth of all cases. Martinet states that only in exceptional instances (one in twenty) will palpitation not induce a characteristic pain at the fundus of the gall-bladder for a more or less long period of time during the intervals between the acute attacks. But in all these cases it is not the character of the pain, but the associated signs and symptoms and clinical course which constitute the basis of the diagnosis.

Appendix pain: Pain in the lower right quadrant revolves chiefly about the diagnosis of acute or chronic appendicitis—yet appendicitis is not the only pain producing disorder met with in this region. Cabot in a report of 1747 cases found 1169 or 66.5 per cent due to appendicitis; of the

remaining cases all but 2 per cent were due to ovarian or tubular disturbances—cases in which sex enters largely into the diagnosis. Every case of appendicitis presents a combination of true visceral pain and viscero-sensory referred phenomena. They consist for the most part of pain in the stomach and epigastrium, tenderness in right iliac fossa, and muscular rigidity. Perhaps no other lesion oftener causes pain in remote parts than does appendicitis. Dr. Ben Johnson used to say that a pain anywhere in the abdomen that can not be accounted for by any other cause is appendicitis. Osler says: "While a very valuable symptom, pain is at the same time one of the most misleading. The tongue is furred and moist, seldom dry. Constipation the rule, but may have diarrhea. Two important signs from the outset are great tension of the right rectus muscle and darting pain on deep pressure, frequently distinct tumor can be felt." Bryan says: "Do not depend on the constancy of any one symptom in appendicitis or other inflammatory lesions. It is not to be ruled out because of normal temperature or leukocyte count." Biliary colic, kidney colic and pains at the menstrual period are diseases most apt to be confounded.

Renal and ureteral pain: The pain of renal and ureteral calculus is usually a mixture of visceral and referred pain, for the reason that in the majority of such cases there is wounding, inflammation and not infrequently ulceration of the ureter. The visceral pain is due solely to the muscular tension of the moving stone and is present only when this is taking place. The pain is similar to that of gall-stones, subsiding and becoming worse in cycles until the passage of the stone relieves it altogether. It may come on abruptly or gradually, is of an agonizing character, starting in hip of side affected, radiating down ureter and into the testicle. There is usually a quick, feeble pulse and profuse perspiration. It may be mistaken for biliary colic, or intestinal colic especially if there is much distention of the abdomen. The direction of the pain down ureter and into testicle, occurrence of blood in urine and the altered character of same are aids to diagnosis.

Intestinal pains offer an example of almost exclusively the true visceral type. Except in cases of extensive ulcerative or inflammatory lesions we do not find any cutaneous soreness, muscular rigidity or reflex phenomena of any kind in intestinal disease. Here we have an exaggerative distention of the musculature. In volvulus and intussusception the pathology to begin with is purely mechanistic, the sensory disturbance is .purely muscular. The pain is entirely visceral, and accurately localized in the intestine, with no referred pain whatever. We have constipation, pain, dry tongue, intense thirst, and vomiting is an early symptom. Time will only permit me to mention uterine and tubal pain; cardiac and anginal pain; cystic and prostatic pain, all of which may enter into the diagnosis of most all of the others.

Bryan says: "Treatment without diagnosis is quackery—sheer, unpardonable experimentation. Some will think that no such absurd thing as treatment without diagnosis exists. The deeds of men indicate otherwise." In inflammatory conditions of the gall-bladder and biliary passages, gall-stones, etc., therapeutic measures are almost always palliative, they are not curative. They are to be removed and are referable to the surgeon. Dietetic, hygienic and medicinal measures should precede, accompany and supplement the operative treatment. The same can be said about appendicitis; there is no medical treatment. Rest in bed, diet, measures to allay vomiting, the relief of pain by ice bag. The giving of opium for the pain should be condemned, and remember that the administration of purgatives, far too frequently done, instead of benefiting actually increased the rate of perforation 400 per cent. We are told that the mortality in clean appendix cases is less than 1 in 1000, and yet statistics show that the mortality has increased 30 per cent in the last few years.

Of course we all recognize the danger of purgatives and opium in volvulus and intussusception.

Admitting as a fact that "most people who die before their time do so because competent search for the cause of their trouble has not been made, or because improper treatment has been administered before the cause of trouble has been found," we as general practitioners must plead guilty to the charge that the public is not receiving the efficient medical care which it has a right to expect, for it is to us to whom it appeals first. That we may remove the stigma let us study symptoms more closely, that we may interpret them more intelligently by the use of our five senses, hard study and common sense. And to quote Dr. Bryan again "Diagnose before the disease has had time to show too many of its characteristics, before it advances far enough to be typical, and you will be great; great will be the reward to your patients in reduced morbidity and mortality." What ails the patient? Can it be relieved? Is it a medical or surgical case? If surgical, is the remedy more dangerous than the disease? Where and when this kind of diagnosis is made mortality, particularly from surgery, is less; unnecessary operations are fewer.

DISCUSSION.

Dr. E. H. Linfield (Gulfport): Just a word in the discussion of general abdominal pain, don't let's overlook the fact that intestinal parasites cause visceral pain, which may be acute, may be sub-acute, or may be chronic. Intestinal parasites can give the same pain that an acute appendix can.

The doctor brought out that kidney stones give severe pain. Another thing we should not overlook is that pathology in the ureters (I mean by that, kinks, strictures, or any other obstruction in the ureter itself) other than a calculus can also cause pain, which may be acute or may be recurring pain. Always keep in mind the fact that you can have an obstruction in the ureter itself that can give this same pain.

I want to congratulate the doctor upon having given a good paper covering a very important subject.

Dr. Holloman (closing): I wish to thank the doctor for his discussion.

I wanted the Association to consider the idea of pain because of the fact that when the general practitioner is called he ought to make a thorough examination of every case that comes under his care and not leave anything undone. I do not want to minimize the value of laboratory work, but many of us do not use our five senses, upon which our forefathers had to depend altogether. I thank you.

DOUBLE EMPYEMA OF THE PLEURAL CAVITIES.*

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Single or unilateral empyema of the pleural cavity is one of the frequent complications of infections of the pleurae. Scarcely a winter season passes without the surgeon encounterinig quite a number of these cases, which vary more or less in degree and severity. Yet we must recognize the comparative infrequency of double empyema of the pleural cavity, since the records for the past twenty years show only twenty cases that are readily available. Seventeen of these cases are taken from the literature, and three cases were brought into St. Francis Sanitarium, for one of these I am indebted to Dr. D. I. Hirsch of the St. Francis Sanitarium of Monroe. This latter case presents such typical features that its study may be interesting and profitable. The other two cases were referred to Dr. Adams and myself, and were handled in a similar manner with the same satisfactory results.

In the study of the twenty available cases it is of importance to know that the frequency of its occurrence is greatest in children under ten years of age. It occurs at any age but, according to the limited and inadequate statistics of the reported cases, it is shown that it is also frequent in adults beyond middle life.

In the report of the twenty cases we find that:

* Read before the Louisiana State Medical Society at New Orleans, April 26-28, 1927.

13 or 65 per cent occurred in the 1st decade
2 or 10 per cent occurred in the 2nd decade
2 or 10 per cent occurred in the 3rd decade
3 or 15 per cent occurred in the 5th decade

Many organisms attacking the respiratory tract may be found in the pus taken from the pleural cavity. It is gratifying indeed to know that the staphylococci and pneumococci were the predominating organisms found in the larger number of cases.

The patient, whose history I will give you, was a small white female child, about six years old, of good nutrition, and previous good health except for pertussis at four and parotitis at three years; there was no family history of cancer, tuberculosis or insanity.

She was admitted to St. Francis Sanitarium on May 25, 1926, having been taken ill two days before with gastric cramps, which persisted after treatment with calomel and oil, and were complicated with nausea and vomiting, abdominal pain, headache, constipation and fever. The temperature was 101 2/5, pulse 120, and respiration 20. The skin was dry and hot, the tongue covered with white debris, and there was slight dyspnea; no enlarged cervical glands were palpated and there was no cervical rigidity. The chest expansion was equal and regular; no increase of excursions was noted, and the accessory muscles of inspiration were not being used. Percussion was negative throughout, and auscultation disclosed nothing unusual in the pulmonary examination. The apex impulse was normal in position, the quality of cardiac tones good; there was no apparent enlargement on percussion and no change in the heart sounds. The abdomen was slightly distended, with good muscle tonus; the upper region was negative, but the lower showed a board-like rigidity, with great tenderness on palpation.

There was no mass palpated, and the percussion note was tympanitic throughout. There was no vaginal discharge, and no inflammation of the external genitalia. The reflexes were regular throughout; no joint or muscle disturbances were noted. The leucocytic count was 13,000, of which 79 per cent were neutrophiles.

The pre-operative diagnosis was acute appendicitis and the patient was taken to the operating room at 3 p. m. for appendectomy. The appendix was found to be retrocecal in type, with slight dilatation of the serosal vessels, and reddening and edema of the walls; the tip was infiltrated, but there was no exudate. The pelvic viscera were in good condition, and no diverticulum was found. The operation was a low right rectus incision, with splitting of the rectus muscle. The appendix and mesentery were ligated, a purse string inserted, the base tied off, clamped and the appendix removed with actual cautery, the stump inverted and mesentery sutured over it, and the abdomen closed in layers.

The microscope examination showed a submucosal infiltration with neutrophiles, and a hyperplasia of the lymph follicles, with slight dilatation of the capillaries.

The condition of the patient during the anesthesia was poor, and 500 cc. of normal salt solution was injected subcutaneously during the operation. Ether was used as anesthesia, and the operation concluded at 3:30. Considering the history of the case and the examination, the patient's condition seemed more serious than could be accounted for by the pathology revealed at the operating table.

On the following day, May 26, the patient seemed slightly improved, resting fairly well, with temperature 102 and pulse 110. The urine showed infection of the renal pelves.

On June 1, examination of the blood showed a tertian malarial infection, and the condition of the patient was not improved. Quinine therapy was begun.

The temperature and pulse continued high on the following day, the respiratory rate increasing, with dyspnea. Pulmonary examination showed a dull area in the upper right thorax, with physical signs of consolidation, which was more marked on the day following. On June 5, however, there was no improvement, with lower pulse, temperature and respiration.

The wound of the abdomen was dressed on June 7, healing by first intention. There was a slight abdominal distention, but the general condition of the patient was about the same. Physical examination of the right lung indicated a probable empyema of that side.

The consultant verified the diagnosis of right empyema on June 8 and advised operation. Incision was made over the 10th right rib, and 4 cm. were resected in the posterior axillary line, after infiltration of 1 per cent novocain. The thoracic cavity was opened and about 200 cc. of thick pus flowed out. Microscopical examination of the pus showed numerous neutrophiles, with a few lymphocytes. Pneumococci were abundant, with a few staphylococci and fibrin flakes. One large rubber drainage tube was inserted and the wound was closed in layers. The general condition of the patient was fair; temperature 102, pulse 120, respiration 30.

The wound in the thorax was draining freely on the following day, but the patient seemed weaker; temperatur 104, respiration 50, and pulse still 120. Widal test returned negative. Quinine therapy was discontinued for the time being. The following day showed an improvement; respiration regular, with only moderate dyspnea; pulse regular and cardiac tones of good quality. Examination of the chest showed another area of consolidation on the right side, but the sounds of fluid were not distinct, and the condition indicated empyema. On June 12 aspiration of the left chest showed thick pus, and the right lung marked impairment of function. Another operation was advised, under diagnosis of left empyema, and the roentgen-ray findings as reported by the radiologist showed that sufficient adhesions had formed to justify the operation.

On June 13 the patient was anesthetised with 1 per cent novocain and about 4 cm. of the left 10th rib resected in the posterior axillary line. About 200 cc. of thick pus was removed, but the patient became very ill on the operating table when the fluid was removed too rapidly, and about 300 cc. more were left to drain away slowly through one large rubber drainage tube. The patient had a severe coughing attack, with slight cyanosis, but improved rapidly when the drainage wound was closed.

The operation was begun at 9:30 A. M. and concluded at 10:15 A. M., the patient's temperature at the beginning being 102, respiration 30, and pulse 120; after the operation temperature was 104, pulse 130. The wound was closed in layers.

Examination of the pus showed pneumococci as the causative organism, with a few staphylococci. The patient returned from the operating room in fair condition.

On June 15 the child's condition showed no improvement. She was taking nourishment well, but the temperature and pulse were remaining very high, despite free drainage of the wounds in the thorax. A catheterized specimen of urine showed the presence of pyelitis, for which treatment was begun at once sodium citrate grains ten every hour. Radiograph of the chest showed the right lung fairly clear, but the left filled with cloudiness indicating the presence of fluid in the thoracic cavity.

The condition of patient improved somewhat on the 17th, the temperature gradually dropping and pulse becoming stronger, although still very rapid. Auscultation failed to reveal any signs of endocarditis. Free drainage from both thoracic wounds continued regularly and on the 20th the general condiiton improved, with temperature 99 and pulse 90; and respiration 40. Patient seemed mentally more acute and the appetite was improved.

On June 28 a radiograph of the chest showed a localized empyema of the right pleural cavity. The wound was opened with the forceps by Hilton's method, allowing improved drainage. The same process was resorted to on the following day, but the pus did not drain freely, and operative removal was advised. The general condition of the patient was better; temperature still irregular, but did not rise over 102, and the pulse averaged about 110.

Under the diagnosis of right empyema due to closure of drainage wound, the former wound in the right thorax was again infiltrated with 1 per cent novocain on July 5, the tissues pushed apart and the wound opened freely by Hilton's method. About 150 cc. of thick pus were removed, followed by a small amount of bloody froth.

The operation began at 9:10 A. M. and closed at 9:20. The condition of the patient was good; temperature 101, respiration 105, pulse 110. Quinine therapy was resumed and all other medication discontinued. The pus showed abundant pneumococci, with a few staphylococci and a thick fibrin content.

On July 9 another radiograph of the chest revealed the presence of a pus pocket in the right pleural cavity, for drainage of which another operation was advised, but in taking the patient to the operating room the pus pocket ruptured through the right posterior chest, allowing the escape of about 300 cc. of dark gray pus. A probe was inserted, and as the drainage was free, the wound was dressed and allowed to run its course.

The patient was allowed to go home on July 11, owing to the insistent pleas of the parents. The child was eating heartily and seemed greatly improved, with pulse 110, respiration 25, and temperature 100. The left chest had healed, but the right was draining freely.

On July 18th the patient was readmitted to the hospital with suspected hookworm infection. The stools showed the presence of numerous uncinaria ova. A blood test showed the hemoglobin 70, with a red cell count of 4,000,000, white cell count of 10,000, with 25 per cent small mononuclears, 7 per cent large mononuclears, and 68 per cent neutrophiles; no eosinophiles. Physical examination of the lungs was negative, and both scars in the thorax had healed fairly well. Radiographic examination of the lungs showed both lobes clear and nothing pathologic in the findings. The parents stated that the child was normal, except for difficulty in concentration on subjects.

Acute infectious diseases of the chest, when coming under the observation of the physician should have diligent care and attention. The chest should be gone over in a very deliberate manner, and studied carefully by the stethoscope and trained ear. Examination should be made frequently and all changes should be noted. When in doubt as to the possibility of an effusion or an empyema of the pleural cavity, the roentgen-ray should be used in a confirmatory manner. If these cases are diagnosed early, and the proper treatment instituted, many serious and possibly fatal complications can often be prevented.

Among the most frequent complications we have as a sequela to the empyema of both pleural cavities are those of pyemia, trophic neuritis, mastoiditis, etc. Unfortunately graver complications than those mentioned here are possible. For instance, Dr. Durham, in a 1920 Journal of the A. M. A. reports osteomyelitis of the ilium complicating his case, which was a delayed one, four and a half months after the onset of the disease.

In one of my two cases infection of the pleural cavities began nine months before she came under my observation. She was then referred to me for osteomyelitis of both tibia.

It may be said in general that the occurrence of double empyema, instead of being a contraindication of treatment by drainage, renders such an operation more urgent. It is probably better to drain the pleura before operating as much as possible, in order to relieve the pressure upon the heart and lung. It is better to allow a few days to elapse before the second operation.

Double empyema in children, when treated by free drainage, is usually followed by complete recovery.

The period of convalescence intervening between the operation and the healing of the wound for thoracotomy in these series of cases vary from ninety to one hundred and fifty days, an average of eighty-five days. While resection with free drainage is unquestionably the proper way to handle all cases of double empyema, it has been shown that the after care of the patient has largely to do with the saving of the individual's life, and the rapidity of its recovery. For instance, keep the wound draining freely and in a healthy condition. Patient should enjoy the privilege of fresh air, and an abundance of well regulated and properly planned diet. Heliotherapy and rest properly administered are indispensable adjuncts.

THE ETIOLOGY OF MEASLES.*

CHARLES W. DUVAL, M. D.,

NEW ORLEANS.

There are few infections and no exanthematous diseases as common as measles. All races and ages seem to be susceptible, though children are more often attacked, and the discrepancy between adults and children is probably because adults have had the disease before they attain adult life. Susceptibility of those who have not had measles seems to be practically universal. This was clearly demonstrated by the statistics of concentration camps during the world war, which show that definite exposure to measles of an uninfected person invariably resulted in an attack.

Measles is communicated by the secretion from the nose and throat and not conveyed indirectly. There is no evidence to show that the virus under ordinary conditions is capable of infecting after more than a short sojourn outside of the living host. The mode of transmission is direct from person to person through what is termed the droplet method. It has been determined experimentally that the disease is highly infectious as long as four days before the "rash" appears, which corresponds to the early acute stage when the mucous membrane of the

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upper respiratory tract is the site of inflammatory reaction, and since at this period the patients are rarely very sick this is the most dangerous time for transmission of the virus.

So called uncomplicated measles is attended with a very low mortality. Fatal cases are commonly attributed to complications such as pneumonia, otitis media, encephalitis and sepsis, which are not generally regarded as due to the virus of measles but to secondary pyogenic invaders. It is a matter of common knowledge, in this connection, that measles complicated by pneumonia is usually at times when ordinary colds and upper respiratory infections are prevalent, which is an indication that the specific excitant of measles is not directly responsible for the pneumonia. This is substantiated by the results of animal experimentation. For example, the experimentally induced disease in animals not susceptible to infection with the common respiratory flora of man, is never attended by pneumonia. It would seem that the pneumonia of human measles is not caused by the spread of the measles virus of the bronchial lesion but is due to streptococcal and other pyogenic organisms which normally inhabit the upper air passageways of man. The pneumonia in measles is in all respects like that complicating influenza.

In regard to the causal excitant of measles one of the most important facts to be borne in mind by those attempting its isolation and cultivation is the infectiousness of the naso-pharyngeal secretions in the pre-exanthematous and eruptive stages of the disease. This feature, more perhaps than any other, has lead some investigators to regard the specific excitant as an agent different from those of other infectious diseases. Although such a preconceived idea has, of course, no scientific basis, it is largely responsible for the skepticism and lack of interest in the reports of those who claim etiological relation for their cultures recovered from cases of measles. In the opinion of the writer it is a mistake to condemn a culture isolated from the lesion of measles as of no causal significance because its morphology happens to be like that of some well known species common in the throat of man. However, in defense of the criticism, it must be said that the mere presence of a microbe in the inflamed mucous membrane of the upper respiratory tract, and particularly streptococcal-like organisms which are known to be normal inhabitants of this region, does not justify the conclusion that it has causal relation without other strong corroborative evidence.

Since the normal flora of the naso-pharynx offers many difficulties in the separation of the measles excitant it is preferable to utilize the circulating blood for cultural purpose. Early in measles the blood is free from extraneous microorganisms and is known to contain the specific virus of the disease .

The lesion of measles is a non-suppurative process, therefore pyogenic organisms cannot be considered as playing the productive role. However, the constant presence of large numbers of streptococci or other pyogens deep in the lesions, especially those of the respiratory mucous membrane, is evidence of a superimposed process and one produced by secondary invaders. In this connection it may be said that since the discovery of the streptococcus of scarlet fever, the work on the causation of measles has attracted more attention than would have been the case otherwise. There are those who are now inclined to indict the streptococcus as the causation of measles.

That the blood and the naso-pharyngeal secretion of patients suffering from measles contains the virus is at present unquestioned. Guinea pigs, rabbits and monkeys injected intravenously with the filtrate of human measles, blood and naso-pharyngeal secretion, react in a characteristic manner. This reaction consists in pyrexial changes, leukopenia and rash which corresponds to the symptom complex of the human disease.

Goldberger and Anderson[1] in 1911 succeeded in producing in the monkey,

injected intravenously with filtered pharyngeal secretions, a symptom complex which they interpreted as mild manifestations of measles. Blake and Trask,[2] more recently, working with the unfiltered naso-pharyngeal secretions introduced intratracheally into the monkey, confirmed and extended the observations of Goldberger and Anderson. Grund[3] in 1922 by intratracheal injections of filtered and unfiltered naso-pharyngeal secretion, obtained from the human case during the pre-eruptive and early eruptive stages of the disease, succeeded in producing a series of reactions in rabbits which were considered suggestive of the human disease. The author[4] in the same year reported the successful production of measles in the guinea pig and rabbit with the filtered blood and naso-pharyngeal secretions obtained from the human case during the eruptive stage of measles. Thus it is seen that the symptom complex of measles including the exanthem and enanthem may be experimentally induced in the lower animal with either the filtrate of blood or naso-pharyngeal secretions. The transmission experiments have definitely established that the causal excitant of measles is transmissible from man to lower animal, is filterable and exists in the circulating blood and the naso-pharyngeal secretions during the pre-eruptive and eruptive stages of the disease.

Although the virus of measles can be propagated in the lower animal, its cultivation in vitro has not been established. No culture extant today is accepted as the real primary excitant of measles. Various intracellular protozoal-like bodies, bacilli and cocci have been reported and etiological relationship claimed, but these reported successes have not been corroborated. While much valuable information has been gleaned concerning the nature of the measles excitant, the specific factor in culture still remains questionable. Of the various cultures isolated from cases of measles that of Tunnicliffe[5] is entitled to special consideration. This author in 1917 reported the cultivation of a diplococcus from the blood of patients suffering with measles which was capable of inducing the disease in the experimental animal and fulfilling other requirements necessary to establish causal relations. A recent epidemic of measles in New Orleans has afforded the writer[6] the opportunity of investigating the claims of Tunnicliffe. The results of our studies confirm in part the work of Tunnicliffe in that a similar diplococcus was cultured from the blood of human measles. It appears that this coccus is not only filterable but apparently invisible for that period in which it is living in the host. Aside from the question of its possible causal relation to measles, there is no doubt that it exists in a filterable form in the circulating blood during the eruptive stage of the disease.

In regard to pyogenic micro-organisms in measles severe streptococcal infection may be a common accompaniment, and since there is a lack of knowledge of the primary cause of measles there are those who would ascribe to the streptococcus a primary causal role. In this connection it is apropos to mention that the histopathological study shows innumerable streptococcal-like organisms that are intimately associated with the coryzal and pharyngeal lesions of measles. Infection with this group of organisms is to be regarded, in the opinion of the author, as coincidental and secondary because filtrates of the infected tissues will induce measles in the experimental animal, while pure cultures of the cocci fail to do so. The fact that the virus of measles is filterable has been the greatest barrier to the acceptance of any microbe which is non-filterable as the causative factor of measles. In the light of our recent studies (Duval and Hibbard) upon the coccus isolated from measles by Tunnicliffe, it would seem that changes in size from visible to invisible and vice versa are properties possessed by this culture. In the living host this organism is apparently not within the range of visibility and a non-filterable form is

cultured from the filtered infectious material. This observation removes at least one objectionable feature that has stood in the way of the Tunnicliffe coccus being seriously considered as having any etiological significance. Aside from a possible causal relationship its filterability conforms at least, to our conception of the virus of measles.

In attempts to isolate the virus of measles from naso-pharyngeal secretions we must not lose sight of the fact that streptococci and other pyogenic organisms are confusing factors by virtue of their position and the part they may play as secondary invaders in diseased conditions of the respiratory tract. The mucous membrane lesion of measles is likely to become augmented by other and secondary infections, the most common of which is streptococcal. The latter is distinguished when the inflamed mucosa of measles becomes sprinkled with hemorrhages, covered with macroscopic exudate, ragged ulcers and pyriform sinuses. The streptococci may burrow deep into the underlying tissues and produce a phlegmonous infiltration, while the lesion of measles in this situation is a mild inflammatory process.

The pneumonia in measles is due to secondary pyogenic micro-organisms which have gained entrance to the lung tissue from the measles' lesion of the bronchial mucous membrane. Complicating streptococcal pneumonia becomes an extremely severe infection and assumes peculiar characters which make it easily recognizable in that it is progressive and often rapidly fatal. It is very doubtful whether the virus of measles ever gives rise to a true pneumonia. The lesion of measles, in so far as the respiratory tract is concerned, is confined to the mucosal lining.

In conclusion I would say that as a result of experimentation it has been definitely established that the blood and naso-pharyngeal secretions of human cases of measles contains the specific excitant. The reaction in the experimental animal is characterized by a complex of objective and subjective signs which closely resembles measles in man. Leukopenia is always a constant change, appearing about the time of temperature rise and lasting throughout the period of pyrexia, which feature precludes the streptococcus and other pyogens as primary causal excitants. Exanthems and enanthems are also frequent in measles experimentally induced.

A filterable form of a living micro-organismal agent (Tunnicliffe's coccus) occurs regularly in the circulating blood of measles and is cultivatable as a non-filterable coccus. While this coccus gives rise to significant reactions in the experimental animal and the human skin of those susceptible to measles, it remains yet to establish its etiological role in measles.

BIBLIOGRAPHY.

1. Goldberger, Joseph & Anderson, J. F.: The Nature of the Virus of Measles, J. A. M. A. 57:971, 1911.

2. Blake, F. G. & Trask, J. D., Jr: Susceptibility of Monkeys to Virus of Measles, J. Exper. Med. 33:385, 1921.

3. Grund, M.: Susceptibility of rabbits to virus of measles, inoculations with nasopharyngeal materials, J. Infec. Dis. 30:86, 1922.

4. Duval, C. W. & D'Aunoy, R.: Studies upon experimental measles; effects of virus of measles upon guinea pig, J. Exper. Med. 35:257, 1922.

5. Tunnicliffe Ruth: The Cultivation of a Micrococcus from Blood in Pre-Eruptive and Eruptive Stages of Measles, J. A. M. A. 68:1028, 1917.

6. Duval, C. W. & Hibbard, R. J.: Further Studies upon Etiology of Measles, Proc. Soc. Exper. Biol. & Med. 24:519, 1927.

DISCUSSION.

Dr. W. H. Harris (New Orleans): Mr. Chairman and Members: I appreciate very much the invitation to open Dr. Duval's discussion. On the other hand, I do not know that there is much that I could add to what he has already said. I have had no personal experience in experimentation with measles and as a consequence my remarks can only be based upon contact with the experiments that Dr. Duval has carried out in the laboratory, together with the data obtained from the literature and personal interpretations.

There seems to be no doubt, as Dr. Duval has already said, that the disease has been successfully transmitted to man and also to animals. Holmes of Edinburgh, back as far as 1759, took the nasal secretion of measles cases and rubbed it onto scarified areas of human volunteers and apparently successfully transmitted the disease.

The later experiments that Dr. Duval has mentioned, carried out by Goldberger and Anderson, Blake and Trask, and Dr. Duval himself, have satisfied us that the disease is transmissible not only through infectious material but through infectious material that has been filtered. Contrary to what Dr. Daspit has said about filtrable viruses, we always are satisfied that we have obtained some information when we can find that an agent will pass through a filter. It affords us at once some knowledge of its general nature.

As regards the organisms received from measles cases, which have been very protean in character, there is no doubt that the coccus isolated by Tunnicliffe, which dates back I think to 1917, seems to hold the field at present for most important consideration. The other organisms have as a whole been discarded as probable etiologic agents. The organism of Tunnicliffe and that of Coronia of Italy, together with that of Ferry and the one that Dr. Duval and Dr. Hibbard have isolated, from descriptions, bear a considerable amount of similarity. They are cocci and diplococci. There are some little variant features as regards the question of pigment production and the matter of the Gram's stain. Just what these particular features mean, if anything, will eventually be cleared up.

The prophylactic experimentation has included the administration of serum, obtained either from convalescents of measles or from immunized animals. The prophylactic experiments obtained by Coronia with the vaccination of his coccus are of interest. For instance, the statement is made that in Italy after vaccination with the Coronia coccus vaccine contact with measles is permitted and that ninety-eight per cent of those vaccinated have shown protection.

Such results, if they are based upon sufficient numbers, are certainly very striking since we know that the disease is a very highly contagious disease. Dr. Castellani, mentioned to me however, that in Italy the Coronia coccus has not been accepted as the cause of measles.

There seems to be one feature that will eventually clear up this situation and that is, since the infectious materials and their filtrates are capable of satisfactorily reproducing the experimental disease in the lower animals, therefore, the use of pure cultures of the organisms considered as being the cause should be more capable of producing this particular disease in the lower animal. From such an infected experimental animal, the organism could again be recovered and thus Koch's postulates could be fulfilled.

I know that Dr. Duval's work and the work of others in this field are of great value. Dr. Duval has been interested in the exanthemata, particularly scarlet fever, dating back to the time he first came to New Orleans in 1909. I remember that his first talk in this lecture hall was upon the etiology of scarlet fever. I believe that if we can isolate, identify and establish this coccus as the cause of measles, it will be the means of saving a great many lives that are lost not through measles per se but through the drastic complications that often occur with this disease.

Dr. J. H. Musser (New Orleans): The evidence I have to bring before you today as to the organism that Dr. Duval has isolated is allied rather with immunological studies than with causal or experimental studies in the reproductior of the disease in animals.

I had the opportunity of testing by means of a toxic filtrate which Dr. Duval prepared for me a goodly number of individuals who had or who had not had measles. The first experiments were carried out in a children's home here in town, testing out eighteen children who had not had measles. The asylum had a very careful record kept of the illnesses the children had suffered while in the asylum so there is not much doubt that these children did not have the measles. Of the eighteen children that Dr. Wirth and I tested, we found that seventeen gave a positive reaction to the interdermal injection of this toxic filtrate. The controls were negative. One child gave a positive reaction, but in going over the records again with the matron of the asylum, we found that this child had had an attack of measles two years ago. When the matron separated the measles children from the non-measles children, she made a mistake and included this child in the list we had of those who had not had the disease.

Eight medical students were good enough to volunteer and allow us to give them an interdermal injection, which is carried out exactly the same way as all interdermal injections are, as a test of immunity. Of course, the Schick test (as well as the Dick test) is the one we know the most about, but the procedure of testing for measles is carried out the same way. A positive reaction manifests itself within thirty-eight hours afterward.

To go back to the students, two of them gave positive reactions although they probably had had measles, the remainder were immune and gave negative reaction.

A series of children in the Charity Hospital were tested. Thirteen children were examined. Eight gave a positive and five a negative reaction. Several of those who had had a positive reaction subsequently developed the disease. One child was sent into the measles ward with a diagnosis of measles and was kept there for a period of three weeks. He did not have measles and he had

had a negative skin reaction. It was thought when he was sent to the ward that Koplik spots were in his mouth, but he never developed any further symptoms, never any exanthem. He had not had the disease and in spite of the fact that he was in close contact with a large number of cases of measles the child did not get the disease.

In addition, we tested out a series of convalescents, fifteen all told, all of whom gave negative reactions. We tested out some children who were seen in the early stages; that is to say, who had been contact cases and who had Koplik spots. We found that we would get a positive reaction before the appearance of the rash and that after the appearance of the rash, very much as with the Dick test, the reaction would become negative and would persistently remain negative.

I think the result of these tests shows quite positively that this organism in the present epidemic at least played an important role.

I think Dr. Duval has been extremely cautious in his interpretation of his results. My own feeling is that he very likely and undoubtedly has the organism that causes the disease.

There was one other thing of interest which came out in the paper, at least of interest to me particularly. He mentioned the complication of encephalitis. Encephalitis is not a complication of measles, which is mentioned in the textbooks, nor have I, in a rather careful survey of the literature, been able to find any reference to this particular complication.

We have had a large number of cases of measles at the Charity Hospital. Five of those cases that came to autopsy showed very distinct growths and microscopical evidence of encephalitis. Furthermore, they showed also clinical evidence of cerebral irritation before their death as manifested by convulsion, tremor, etc.

Dr. Rodger Hibbard (New Orleans): Mr. Chairman and Ladies and Gentlemen: One would think that in the ten years that have passed since clinically isolating this organism some one would have done some work either for or against its etiological significance in measles. The reason that this has not been done is undoubtedly what Dr. Duval has mentioned; namely, that measles is definitely known to be a virus. That is a proven fact and the streptococci in common with all other cocci are not generally considered to be filterable and hence nobody has paid any attention to the isolation of a coccus from measles.

One of the more important factors bearing on the case is that just now brought out by Dr. Musser, the skin reactions. The fact that you get a skin reaction with a filtered bouillon culture of the organism shows that there is some definite connection between the organism and measles. That may be primary; it may be secondary; I won't go so far as to state. However, supposing it is secondary, of what importance is it?

Dr. Duval has explained that the fatalities in cases of measles are not due to measles per se but due to the complications of measles. If that is true and since this organism of Tunnicliffe produces a solvent toxin, it follows in line that there may be an antitoxin that can be developed from it and in this way cut down the incidents of secondary complications and the mortality rate.

As a matter of fact, Tunnicliffe within the last year, working in Chicago with clinical men, prepared a serum from the goat and they state that the incidence of secondary complications was much less in those cases where they injected the serum than it was in the control cases of measles where they did not.

If the organism is the primary factor, and there is evidence that makes us think that perhaps it is, one can see the great importance of it.

Dr. Harris mentioned the results of Coronia with his coccus, which to be sure differs slightly but which may be a difference in the staining technic. If we can duplicate those results with this coccus, I think every one will agree that the study and the isolation of the coccus has been well worth while. So from whatever view one looks at it, I think that everybody will agree that this coccus in some measure, whether primarily or secondarily, is certainly a very important factor in the scientific study of measles.

Dr. Randolph Lyons (New Orleans): I want to say that I have been very much interested in Dr. Duval's work of the last year in measles. While I don't personally see a great many cases of measles and I do not treat children, it seems to me the evidence brought forth today by Dr. Duval and the evidence brought forth by Dr. Musser in his work in the asylums and among the children of the Charity Hospital certainly goes a long way to confirm the proof that Dr. Duval has isolated the specific organism.

I have always had a good deal of respect for micro-organisms and I now have still more. I can remember when I was rather astonished when we discovered first that they could change their form. Now we find they can change their shape and size and become visible or invisible.

Dr. Rena Crawford (New Orleans): I was very much interested in his statement once or twice in his paper that measles organisms do not seem to produce the pneumonia, and the reason that we have so much pneumonia with measles is because measles usually comes at the season of the year when we have the respiratory diseases.

One thing I have noticed is that pneumonia follows more frequently in these measles cases where patients have been exposed to so much heat. All of you know that when you go into a home and you announce the baby has measles or you think the child is getting measles, the mother immediately wants to put it in a hot bath no matter what the temperature, take it out of the bath and roll it in a blanket and keep it there until the rash comes out. The babies that have been so treated, and it is a difficult thing to keep the mother from treating them that way, are the ones who are most prone to have pneumonia.

Dr. C. W. Duval (closing): In reply to Dr. Musser I would say that until quite recently I had not noticed encephalitic lesions in cases of measles; in fact I was not aware that specific changes occurred for the central nervous system in this disease. However, during the epidemic of measles this winter I had the opportunity to observe at post mortem definite gross evidence of encephalitis. Macroscropically the lesions were discrete punctate hemorrhages in the cortical substance of the brain and in the basal ganglion, especially the optic thalamus. Associated with the larger hemorrhagic areas, there was, what apparently seemed to be, necrosis of the brain tissue. Microscopic study of the lesions revealed thrombosis and necrosis of the capillaries, perivascular leukocytic infiltration (mononuclear) and some hydropic condition of the nerve cells of the involved areas. It is remarkable that the lesions are focal in character, resembling in many respects the lesions of so-called encephalitis lethargica. These findings in the brain of the measles substantiate those found by Dr. Hauser, Pathologist at Charity Hospital, who tells me he has noted the same lesions in a number of post mortems held on cases of measles.

As regards the causal relationship of the culture isolated by us, which as stated is identical to the Tunnicliffe coccus of measles, we prefer at this time not to commit ourselves definitely. It can be said, however, that the coccus fulfills the essential postulates required to establish causal relation, and conforms to our conception of the excitant of measles (filterable virus). Dr. Harris points out that it ought to be relatively easy with our present knowledge of the experimentally induced disease, to determine whether or not the Tunnicliffe coccus plays the specific causal role. In this connection I would say that the symptom-complex of human measles, with perhaps the exception of the exanthem, has been produced in the lower animal with the coccus in question both by Tunnicliffe and by ourselves. Furthermore, Dr. Musser and his associates have obtained what appears to be specific skin reactions with the culture filtrate (toxin). While all this is pretty definite evidence of the etiological relation that the coccus bears to measles, more confirmatory work is necessary in order to rule out the presence of some other virus which may be carried in culture along with the coccus.

THE DIAGNOSIS OF ACUTE OSTEOMYELITIS.*

GUY A. CALDWELL, M. D.

SHREVEPORT, LOUISIANA.

The subject I am going to present briefly is the diagnosis of acute osteomyelitis. Doubtless there are subjects which would interest you more; certainly there are others which appealed to me more, but the mortality and disability statistics for this disease in Louisiana are such that it seems imperative that someone who is interested should review the matter for you. Moreover it is evident to all who study these cases that early diagnosis and operation will completely revolutionize the situation as to results. In the larger clinics it is estimated and conceded that, when acute osteomyelitis is adequately drained in the first 48 hours of the disease, the mortality is only 1 per cent, the period of disability is usually less than 3 months, the numbers of secondary and tertiary operations for the chronic stages are reduced 50 per cent or more, and the extensions to joints with resultant stiffness, contractures, and deformities, are almost nil.

The following estimates are based upon the mortality statistics of Louisiana, 1915 to 1925, inclusive, and the reports from the two State Charity Hospitals for the same period. Approximately 700 new cases of osteomyelitis occur annually in this state, with an average death rate of 4 per cent or 30 cases per year. As no statistics of disability are available, I can only estimate them roughly from my observations of the chronic cases and late deformities seen in my practice and in the hospital clinics of the state. I daresay, however, that of the 670 cases who survive annually, only 125

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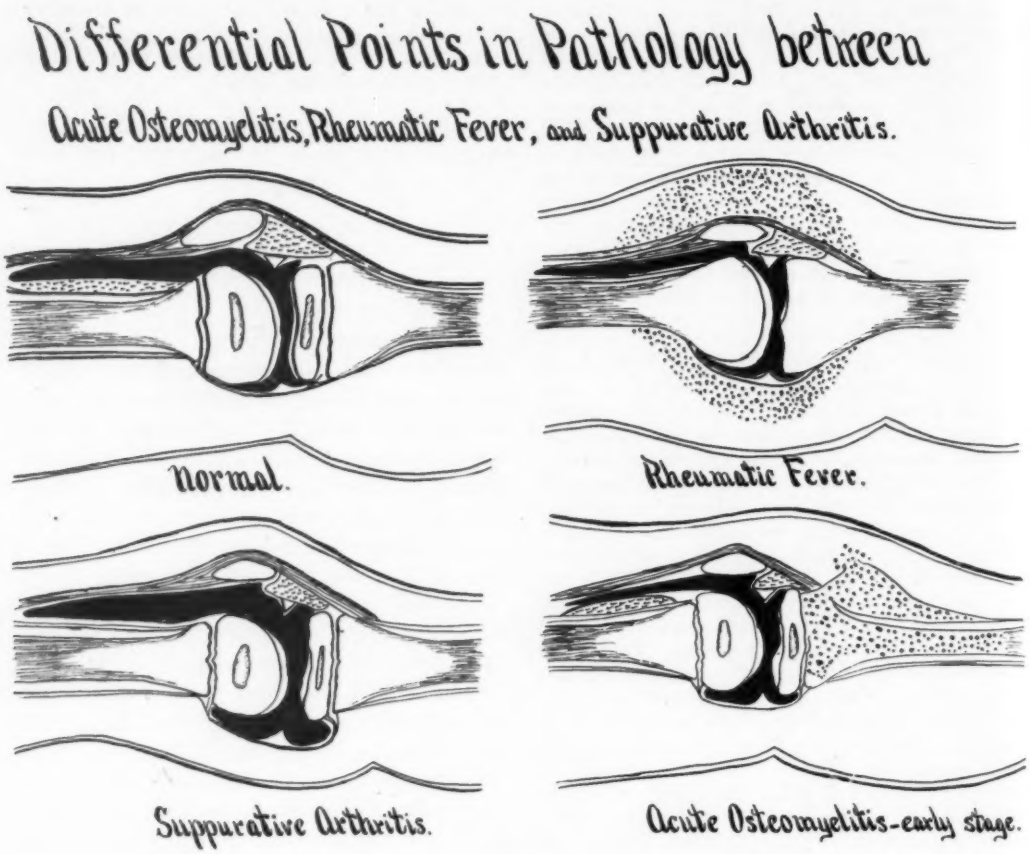

Fig. 1

recover in from 3 to 6 months without appreciable disability. Of the remaining 545 cases, probably another 125 recover without marked disability after 1-5 years and numerous operations, and the remaining 320 recover, after months or years, with a residual deformity or disability that is permanent. At least it can be truthfully said that among the 700 cases developing annually, we are permitting 25 to die who should not die; we are making permanent cripples of between 150 and 300 cases who should be completely cured in 3 to 6 months; and we are keeping the surgical wards filled unnecessarily with difficult chronic cases. (Hospital statistics show that the number of operations being done for chronic osteomyelitis is increasing yearly at an alarming rate.)

Let us see why the acute cases are not being drained in the first 48 hours. A review of the histories of a large number shows that almost every case is seen within the first 48 hours by a physician, but about 75 per cent of them have been diagnosed and treated as *rheumatism* for 1-3 weeks, before being sent to the hospital! We are forced to the conclusion, therefore, that the majority of physicians who see them in the first 48 hours fail to recognize the difference between osteomyelitis and rheumatism. There are many good excuses that this should happen, as I shall show, but as a matter of fact the differential diagnosis between the two at this stage is not difficult, and one needs little more than his five senses to arrive at the correct diagnosis. Roentgen-rays are helpful only in a nega-

Fig. 2

tive way, and while the white blood count usually is between 20,000 and 30,000 with a high percentage of polymorphonuclear leukocytes, it is not the deciding point in the differential diagnosis.

Two facts alone will almost serve to differentiate and establish the diagnosis, (1) the age of the patient and (2) the location of the pain. Acute osteomyelitis is a disease of the rapidly growing years (5-15), marked by extreme pain and tenderness near but not in one of the larger joints, usually of the lower extremity. Acute rheumatic fever with arthritic symptoms is very infrequent between 5 and 15 years; if pain is present it will be directly in several joints, usually the smaller ones. Rheumatic fever with the joint symptoms of pain, swelling, redness, and heat, progressing from one joint to another, as we usually visualize it, is a disease common to the earlier adult years, 15 to 35, while the primary attacks of osteomyelitis are extremely rare in these years. Hence, if one called to see a child acutely ill with pain in the leg or thigh, he should not expect to find rheumatism, but should carefully examine the case for further evidence of osteomyelitis.

Several other points in the history and examination are important in a confirmatory way. With osteomyelitis, one is usually informed of an injury 1 to 4 days before, a blow, a strained or wrenched joint. A little quizzing usually reveals a pre-existing skin lesion, an infected abrasion, furuncle, or boil. The onset likely was with a chill followed by a high fever without remission. The pain and prostration were intense, constant, unrelieved by local applications or anodyne, and these symptoms are disproportionate to the appearance of the part complained of. On examination at this time, all signs except tenderness are conspicuous for their absence. The tenderness is exquisite and sharply localized to the area of bone adjacent to an epiphyseal line. There is no marked swelling, no red-

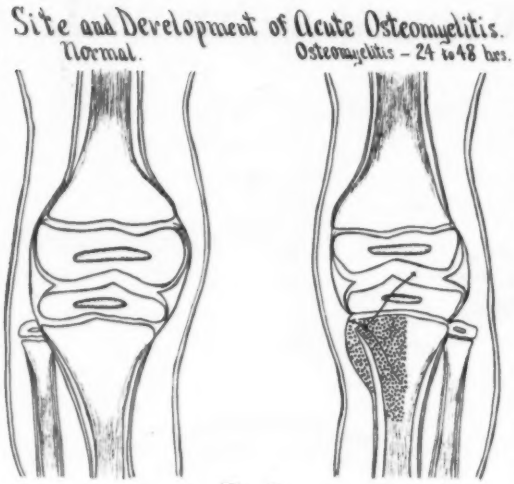

Fig. 3

ness, and little or no heat. The joint expansions and joint lines, if carefully palpated, are found to be not tender or enlarged. If the confidence of the patient can be gained, and the manipulations carefully done, one can move the adjacent joint passively without increasing the pain or producing muscle spasm. Further examination reveals all other bones and joints free of symptoms or signs.

The arthritic symptoms of rheumatic fever, on the other hand, usually follow an attack of tonsillitis or ear infection; they come on more gradually and in general are less intense; local applications and anodynes tend to give temporary or partial relief; the symptoms are accompanied by, if not preceded by, swelling, redness, heat, tenderness, and limited to the joint itself and not present at the epiphyses. All joint movement is absolutely inhibited. Further examination reveals other joints beginning to be involved, or the history that yesterday another one hurt worse.

Another condition which may confuse should be differentiated, viz: acute suppurative arthritis, or pyogenic joint infection. Except for gonorrheal arthritis, and the suppurations secondary to punctured wounds or extensions from a focus of osteomyelitis, this disease belongs to the period of early childhood and infancy, to 4 years. Like osteomyelitis it is usually secondary to skin lesions, is acute in its onset and intense in its general and local symptoms. The mother notes that the baby is sick and sleepless, completely disabled and cries out whenever the affected part is moved. The swelling appears, during the first 24 hours, and is confined to one single joint, usually the knee or hip. The swelling is entirely made up of fluid in the joint; redness and heat are usually absent; tenderness is excessive and joint movement absolutely inhibited; the temperature is high and without remission. This picture is distinguished from the other two by the age of the patient, under 4 years, by the fact that only one joint is involved and it is not red though swollen and distended with fluid, by the fact that the bone above and below the joint is not tender. The diagnosis is rendered absolute by aspirating pus from the joint with an ordinary hypodermic syringe.

The results of adequate drainage in the first 48 hours in these cases are even better than in osteomyelitis. They recover in 6 weeks to 2 months without limitation of the joint motions, but if drainage is delayed a week or more, they are doomed to ankylosis or deformity with disability.

The one point I would like for you to carry home with you is, that if you are called to see a patient under 15 years of

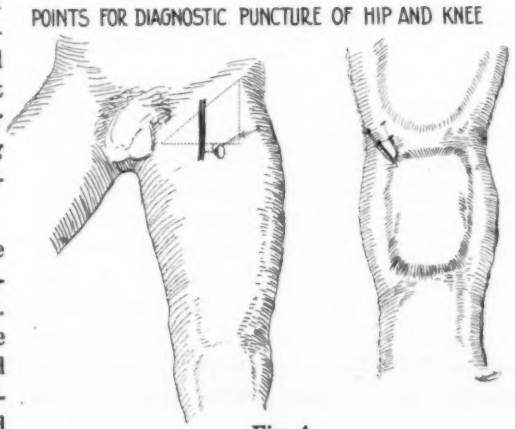

Fig. 4

SUMMARY OF DIFFERENTIAL POINTS IN THE DIAGNOSIS OF ACUTE OSTEOMYELITIS, SUPPURATIVE ARTHRITIS, AND RHEUMATIC FEVER

HISTORY	ACUTE RHEUMATIC FEVER 15-35 YEARS	ACUTE SUPPURATIVE ARTHRITIS—1-5 YEARS	ACUTE OSTEOMYELITIS 5-15 YEARS
Onset	Gradual, often with sore throat	Acute	Sudden with chill
Trauma	Usually none	Often associated	Nearly always present
Predispos. Infect.	Tonsilitis	Ear Infect. and Tonsilitis	Skin trouble and tonsilitis
Pain	Mod. severe — Improved with heat	Severe, sleepless, unrelieved by local measures.	Intense throbbing toothache, heat no value
Temperature	Gradual rise and moderate curve	Rapid rises—High curve	Immed. rise and very high
Pulse	Moderate increase	Rapid, 125-150	Very rapid, 140-180
Prostration	Moderate	Great	Greatest
Examination			
Location	Multiple joints	One joint, usually knee or hip	One focus not in joint—usually tibia or femur
Appearance	Joints enlarged and red	Little or no redness, swelling follows line of joint capsule	Nothing early — general oedema of aff. portion later
Tenderness	General over joints	Excessive over joints	None over joint—acute over bone
Fluid	Little or none	Tense with fluid—Aspirated fluid—pus	None in joint
Movement	Painful	Extreme muscle spasm	Careful movement not painful

age, acutely ill and complaining of sudden, severe pain in the leg or thigh, think first of a pyogenic infection of the bone or joint rather than of rheumatic fever; examine the case most carefully, and if you decide it is probably one of osteomyelitis, do not rest yourself or allow the family to rest until that child is in the hands of a competent surgeon. Telephones, telegrams, automobiles, trains, and all of the other modern modes of rapid transit and communication cannot serve too quickly when one recognizes or seriously suspects acute osteomyelitis or suppurative arthritis. The hours are precious if one is to conserve life, limb, and function. A little alertness in examining these children, a little more forcefulness used to impress the family with the absolute necessity for prompt action, a few dimes and nickels spent in notifying the hospital and surgeon to be in readiness,—and we shall soon see the ranks of the crippled thinning to a remarkable extent.

REFERENCES.

Charity Hospital of Louisiana (New Orleans) Reports, 1915-25. New Orleans, State, 1916-26.

Charity Hospital of Louisiana (Shreveport) Reports. 1915-25. New Orleans, State, 1916-26.

Chatterton—Osteomyelitis in Children, Minnesota Med. 8:91, 1925.

Kelly—Practice of Medicine, Philadelphia, Lea, 1910.

Kennedy—Acute Epiphsitis, Brit. M. J. 2:114, 1912.

Louisiana—Mortality Statistics, 1915-25, New Orleans, State, 1916-26.

MacCallum—Textbook of Pathology, 3d ed., Philadelphia, Saunders, 1924.

Robertson—Acute septic osteomyelitis, M. J. Australia, 2:66, 1925.

Starr—Osteomyelitis, (in Lewis—Practice of Surgery, Hagerstown, Md., W. F. Prior Co., 1926), v. 2:1.

Swift—Rheumatic Fever, (in Nelson's Loose-leaf medicine, London, Thos. Nelson, 1920), 1:401.

Wilensky—Correlation of roentgenographic evidence with clinical and pathological facts in acute osteomyelitis. Am. J. Roentgenol. 16:123, 1926.

Wilensky—Mechanism of acute bacterial infection of a joint. Arch. Surg. 13:895, 1926.

DISCUSSION.

Dr. Carrol W. Allen, (New Orleans): We have just listened to a very interesting presentation of this subject and I feel that there can be no controversy or argument with Dr. Caldwell's conclusions. Acute suppurative osteomyelitis is just as much an emergency operation as is acute appendicitis. The infective organism, usually the staphylococcus pyogenes aureus, travelling through the blood stream, usually from some pre-existing focus, is deposited towards the end of the shaft of the long bone. At this stage, the stage where surgery offers the best prospect, the roentgen-ray is practically useless as an aid. To wait for the roentgen-ray to show pathology, which can only take place after bone destruction, is either to sacrifice the shaft of that bone or the patient's life. Take the typical case which comes with sudden onset, high fever, prostration, leukocytosis and a tender point, nothing could be simpler. But we do not always have that tender point, as illustrated by many of my cases. There are many obscure cases. The typical case is as easy to diagnose as a typical acute appendicitis, and they require just as quick action. The differential diagnosis between acute rheumatism and osteomyelitis has been so well brought out by Dr. Caldwell that further elucidation would be superfluous. In acute osteomyelitis you have one focus at first and later may have others. The patients often hurt all over and are too young to co-operate, they are too sick and it is not an easy matter to determine your tender point. Examine your patient carefully and if you find a tender point you are justified in operating, as in acute appendicitis. In appendicitis, when in doubt, operate—so in osteomyelitis.

In making the opening in the bone, if you do not actually reach the focus, but are near it, you will relieve tension and pus will soon appear. After drilling a hole enlarge with a chisel, but never curette. Do not pack; put in drainage tube and fasten it in and watch: if you have not found the focus as freely and frankly as you should, do not rest there, because other foci may develop later, but watch daily for other suspicious points. As soon as you relieve the tension there is abatement in temperature and the prostration is lessened, but still some temperature continues.

Another thing about subperiosteal abscesses. An acute superiosteal abscess is a very rare thing and in finding pus subperiosteally do not rest there, but go into the bone. Personally, I have seen but one or two subperiosteal abscesses and those were due to direct trauma at the point and it was very apparent that the thing was a local affair and not in the bone cavity.

I thank Dr. Caldwell for his very complete presentation of this interesting subject.

Dr. W. F. Henderson, (New Orleans): The gentlemen who have preceded me have left the roentgenologist hardly a leg to stand on when making a diagnosis of osteomyelitis. Their point is well taken. At the time when the case is first presented, or within forty-eight hours of onset of pain, the roentgen-ray is going to be of very little use except in a negative way. The bone is composed of, or has a large number of Haversian canals and infection passes out of the canals and the pus may burrow its way far from the original focus. Pus is not visible in a roentgenogram under these circumstances, not until the Haversian canals are filled and bone destruction starts. Bone destruction does not appear until pressure of pus in the Haversian canals has changed the blood supply causing necrosis. As the infection reaches the periosteum we have a periosteal reaction and nature attempts to put a shingle on the weak spot, the bone thickens and a protection levee is thrown up. Therefore, one has no right to wait until that is visible on the roentgen-ray plate to confirm a diagnosis. We must realize that when the roentgen-ray is called upon at that late stage to make a diagnosis someone has been derelict in his duty. One has to watch these patients for many months and years to realize that osteomyelitis is one of the most deforming diseases that we have.

Do not misunderstand me. I believe that the roentgen-ray should always be called into use in suspected osteomyelitis, but do not depend upon this in early diagnosis—rheumatism and tuberculosis may be found, but these should not throw you off the diagnosis. Very little harm will result from drilling a hole in the bone: how much better to drill a bone occasionally and save the child's life and health than not do it and engender such a risk.

I wish to mention one other point. The more we know about osteomyelitis, the more we realize there are other sources of infection in the bone far removed from the first focus. I have roentgen-rayed many cases of osteomyelitis, some in the early stages, some in the late; it is an exception to find people with normal bones. We always afterwards find silent foci of infection if a routine examination of a patient with osteomyelitis does not reveal it at one point, it will always show evidence at some removed distance in the body that will later break down and create the same symptoms.

Early roentgen-ray, and do not wait for confirmation of your diagnosis—go ahead and operate.

Dr. H. Theodore Simon (New Orleans): Dr. Caldwell should be commended for his interesting presentation of this subject. Aside from the mortality which Dr. Caldwell spoke of, in our

clinics we see deformities, distorted limbs, and stiffened joints following this condition. There is little to add.

I am glad that Dr. Caldwell brought out the fact that signs and symptoms should have more weight than the roentgen-ray in arriving at a diagnosis in these cases. We depend entirely too much on the roentgenogram to determine this condition and when we see a case in consultation we are invariably told that the roentgen-ray report is negative.

The needle inserted in a joint can do no harm, but the physician should remember that often the patient thinks differently for he has been told never to allow a surgeon to put a needle in the joint.

I am surprised to hear Dr. Caldwell say that Willem's method of treatment for acute infections of the joint does not give results: we have been using it here for several years and have had excellent results.

Dr. Urban Maes (New Orleans): Surgeons on the whole are quite well posted on the diagnosis of acute infectious osteomyelitis, and for that reason I have for many years been of the opinion that a paper such as this should not be read before a surgical section, but before general practitioners. Surgeons rarely see a case in the acute stage. In private practice I have never seen a case, and in hospital practice I can safely say that I have not seen a case for twenty-five years. They reach us in the chronic, and too often in the hopeless stage, which is, to my mind, a distinct reflection on the general practitioners who see the cases first and who obviously fail to make a correct diagnosis.

In a paper before this Society four years ago I tabulated my experiences in this condition, and I also looked over the cases recorded at Touro Infirmary. The matter of diagnosis was extremely interesting and illuminating. The majority of patients were admitted with a tentative or definite diagnosis of acute articular rheumatism, a diagnosis which also heads Dr. Caldwell's list. Other diagnoses included, in the order named, monarticular rheumatism in the child, associated with intestinal upset, typhoid fever, and bone tuberculosis. The average stay days of these patients in hospital was four months, and they were all discharged before a cure was effected. I can give you even more striking figures from Charity Hospital. I have at present four patients under treatment there, and the combined time of their disability totals exactly one hundred years, an appalling loss from an economic standpoint if from no other.

Early cases of osteomyelitis are extremely easy to manage, providing certain basic principles are understood. Infection in the bone follows exactly the same processes as infection in the teeth; swelling cannot occur without necrosis, and necrosis cannot be prevented unless the patients can be seen in the acute, or at least in the early sub-acute stage. The operation itself, if done within twenty-four to forty-eight hours after the onset, consists only of relieving the tension. Under anesthesia an incision is made over the infected spot, and with a drill or some similar instrument two or three holes are bored in the bone, to relieve the tension. The employment of this simple measure at a sufficiently early stage will result, in the vast majority of cases, in a quick and permanent cure.

Dr. Erasmus D. Fenner, (New Orleans): I take a deep interest in this subject and I disagree with Dr. Maes in his assertion that osteomyelitis is not a subject suitable for the surgical section. I believe Dr. Maes' experience in never having seen a case of acute osteomyelitis is that the character of his particular service has not brought him much in contact with this condition and when these cases enter Charity Hospital they are usually assigned to an orthopedic ward. I see a number of cases of acute osteomyelitis in the acute stages and I also see many cases in our big hospital here who oftimes are not given the necessary immediate surgical attention because the surgeon is waiting for roentgen-ray confirmation of his diagnosis before attacking the condition.

Moreover, I disagree with Dr. Maes in that anything that will bore a hole in the bone is enough to stop the progress. I have a case now which is causing me much distress, a child brought to the hospital the third day after onset, experiencing great pain and with high fever. It was Sunday and my coming to the hospital that day was purely accidental. After seeing the patient I asked permission to take the case as an emergency and operated. The disease was apparently in the neighborhood of the hip. I bored two or three holes in the femur but got no pus anywhere. Two or three days later the pus began to pour, general sepsis set in and while fortunately this condition cleared there is now partial dislocation of both hips. I have at present four cases of partial dislocation of the hip following acute osteomyelitis, one treated within the fifth day of the onset of the disease, but in the others the condition had existed for quite a long time.

I do not believe that the general surgeon, as a class, is informed sufficiently in the early diagnosis of acute osteomyelitis, nor does he realize the absolute indication for immediate interference. Distinguished men have recently written articles in which they claim that boring the bone is not necessary, that merely incising the periosteum will suffice; my own personal conviction is that we should bore the hole to make sure.

I think the discussion of acute osteomyelitis is a good thing for the general practitioner and a better thing for a great many surgeons.

Dr. Guy A. Caldwell (closing): I wish to thank all who have so kindly discussed the paper; it goes to show that it is a subject we need to keep before us all the time.

With reference to Dr. Allen's points they are certainly true. The tender point is difficult to locate in a child or an adult who is seriously ill with generalized pain. I, like Dr. Maes, have seen but few cases in the acute stage, but those that came under my observation had marked points of tenderness and were old enough to point them out accurately. In taking the history of a patient it is nevertheless true that it does not always have the finely defined points portrayed in the literature.

With reference to the development of other foci referred to by Dr. Henderson, that seems to me to be a question of early operation. Certain experimental work has been done, showing that failure to secure good drainage early in the course of the infection is often a cause, the organism being "driven in," so to speak, leading to the later development of silent foci. Dr. Henderson also touched on the point of making roentgen-rays in all these cases because of their value in a negative way. I have never subjected a case to operation without roentgen-ray and never expect to, but it is of value in the early case only in a negative way. I have seen cases which we found later to be osteomyelitis in which the roentgen-ray, or blood chemistry, or other examinations we make in a hospital, were the deciding point in undertaking operation, but they are few and far between.

Dr. Simon misunderstood me with reference to Willem's treatment of acute suppurative arthritis. I think in this particular group of cases, which are under five years of age for the most part, it is not as necessary and not as practical or simple as extension by attaching a weight to the limb.

Dr. Maes' various points are appreciated very much, that is in dwelling on the long disability, particularly in our femur cases. The femur cases, as we know, are the most difficult, yet they, too, can be saved from these years of complete disability if taken in time.

Dr. Fenner brought up an interesting point well worth dwelling upon. Cases of involvement in the upper end of the femur are difficult to treat. I believe that in nearly every case of osteomyelitis developing in the neck of the femur or close to the epiphysis, the hip joint should be drained; I have drained the joint in two such cases, and failed to do so in one other; the two I drained did well, but the other did not, resulting in complete dislocation of the joint. If we drill and find no pus, I feel we should investigate the joint by aspiration.

APPENDICITIS COMPLICATING PREGNANCY.

AIMÉ PAUL HEINECK, M. D.,

CHICAGO, ILLINOIS.

Appendicitis is frequent and doubly significant during the child-bearing period. It, not uncommonly, complicates and unfavorably influences pregnancy; at times, it provokes the premature termination of gestation. Appendicitis occurring during gestation can prove fatal to the mother, to the fetus, or to both mother and fetus. It is well deserving of study by the gynecologist, the obstetrician and the surgeon. All the various grades and varieties of appendicitis, primary or secondary, acute, subacute, chronic, or recurrent, catharrhal, ulcerative, suppurative, gangrenous, perforative or adherent, and its various complications and sequelae, adhesion formation, abscess formation or peritonitis, localized or generalized, occur during gestation. The morbidity and mortality of appendicitis is greater in the pregnant than in the non-pregnant. Early and correct diagnosis, followed by immediate appropriate and skillful surgical relief, will reduce both the morbidity and the mortality of the disease under consideration.

This contribution is an analytical study of all the operated cases of appendicitis associated with gestation, intra- and extrauterine, reported in the English, French and German medical literature from 1916 to 1926 inclusive.* In the Illinois Medical Journal, April, 1917, I published a similar study of 173 operated cases of appendicitis associated with pregnancy, reported from 1900 to 1915 inclusive.

This analysis of 405 cases of appendicitis diagnosed either at the operating table

*All the medical publications are to be found at the John Crerar Library, Chicago, Ill.

or established by the postmortem findings, amplifies and supplements my previous publication. They occurred in 405 pregnancies, 21 of which were ectopic in location, while the remaining 384 cases were intra-uterine.

Appendicitis complicating the puerperium is not considered in this paper; it imperils only the maternal life and constitutes a separate chapter of appendicitis. Uterine gestation complicated by appendicitis presents two indications: The saving of the fetal life and the saving of the maternal life. Of the two, the latter is all important.

Cases in which the diagnosis of pregnancy was not fully established at the time of operation were also excluded. Tracy[5] removed an acutely inflamed appendix from a stout nulliparous woman. She had missed her menstrual period for a few days. It was not possible, previous to or at the time of operation, to make a positive diagnosis of gestation. Time settled the question; she was delivered at full term.

Cases in which the products of conception were expelled from the uterus previous to the development, diagnosis or surgical intervention for the relief of appendicitis were omitted. In a twenty-one year old primipara,[35] labor pains appeared during the ninth month of gestation; the cervix dilated and spontaneous delivery of a non-viable child occurred. The abdominal pain continuing and the general symptoms becoming worse, appendectomy was performed on the following day. Inflammatory products escaped from the abdominal cavity and death of the mother six hours after from general peritonitis. Needless to say that we also excluded cases in which the removed appendices were found, after careful examination, to be normal.[37]

Pus collections, presumably of appendiceal origin, evacuated by colpotomy were excluded, unless the diseased appendix was exposed to inspection or direct palpation. This explains the omission of cases similar to that reported by Favreau and Chaput[19] in which 500 grammes of dark brownish pus were evacuated by colpotomy. The appendix not having been exposed, the clinical diagnosis of appendicitis was only presumptive and not conclusive.

EXTRA-UTERINE PREGNANCY.

Extra-uterine gestation, aborted, ruptured or in progress, abdominal or intra-ligamentary, ovarian, tubal or tubo-ovarian, calls for immediate removal of the ectopic fetal sac, irrespective of the age of the pregnancy or of the mother's general condition. This is a life-saving indication. In ectopic pregnancy, the life of the fetus is to be disregarded. Appendicitis, irrespective of type, calls for surgical treatment, ablation of the appendix preferably.

Ectopic pregnancy occurs at all periods of the child-bearing age. Ectopic pregnancy and appendicitis are surgical conditions, each calling for immediate operative relief. When the two conditions coexist, the call for surgery is two-fold: The fetal sac and the diseased appendix should be removed at the same sitting. This double removal is the procedure of election; it was instituted in twenty of the cases herein considered and was followed invariably by recovery. Some clinicians follow a different course. Gore's[21] patient presented the symptoms of appendicitis; the point of greatest tenderness was four inches to the right of the umbilicus and about one inch above. Bimanual examination showed a soft cervix, admitting the tip of one finger. Child's head was felt through the lower uterine segment. Patient complained of excessive fetal movements. During examination, vigorous movements were observed through the abdominal wall. The appendix was removed. On the 7th postoperative day, it was decided, after consultation, to deliver the patient. The patient having been etherized, manual dilatation was begun, and the uterus was found empty. A laparotomy was then performed; the peritoneal cavity contained blood-stained fluid and a large, bluish tumor the

size of a six-months' pregnant uterus, attached to the right broad ligament by a small twisted pedicle. This sac-tumor had made two complete turns on the axis of its pedicle and had the odor of degenerating blood. The pedicle was clamped, the stump transfixed and ligated, and the tumor removed. Examination of pelvic organs showed uterus in normal position, enlarged to three times its normal size. Left tube and ovary normal. Drainage; abdomen closed in usual manner. Tumor which included the right tube and ovary contained a six-month male fetus, apparently dead for thirty-six or forty hours. In four cases,[23,25,39] the inflamed appendix and the ruptured fetal (tubal) sac were removed at the same sitting. In these four cases as in all tubal pregnancies that rupture into the peritoneal cavity, peritoneal flooding was present. In three cases[29,39] of incomplete tubal abortion, the tube, the products of conception and the inflamed appendix were all removed at the same sitting. The appendicitis that coexists with ectopic gestation is usually chronic. All but two patients gave a history of having had previous attacks of appendicitis. In most cases, the appendix was found to be adherent to some adjacent organ or structure: Omentum, right tube and ovary, uterus, or urinary bladder.

AGE.

Appendicitis occurs at all periods of the child-bearing age; its incidence is possible in any gestation, first, subsequent or last, uterine or extra-uterine, single, twin or multiple. In the cases herein analyzed, the age incidence is reported as follows:

From 15 to 20 years	46 cases
" 21 to 25 years	107 "
" 26 to 30 years	100 "
" 31 to 35 cases	63 "
" 36 to 40 years	25 "
" 41 to 45 years	3 "
46 years	1 case
Age not stated	60 cases

In the above cases, the age stated is that of the patient at the time of operation. The three youngest patients were 15 years (one-32) and 16 years (two cases) of age, respectively. One of the last two patients was operated after the acute symptoms had subsided;[25] the other, during the acute attack.[39] The oldest patient was 46 years of age.[39]

No relation was observed to exist during gestation between the age of the prospective mother and the extent, virulence and outcome of the appendiceal inflammation. More than one-half of the cases occurred between the ages of twenty-one and thirty, inclusive.

NUMBER OF PREVIOUS PREGNANCIES.

Primipara	36 cases
II-parae	143 "
III-parae	74 "
IV-parae	6 "
V-parae	4 "
VI-parae	2 "
VIII-parae	2 "
IX-parae	1 case
Multiparae	2 cases
Not stated	135 "

One patient[8] presenting a five-month-pregnant myomatous uterus, had never had any living children, but had two miscarriages. Another patient was a three-month-pregnant multipara.[9] In 135 cases, the reporters do not state whether their patients had previously been pregnant. In 143 cases, over one-half of the cases in which the number of pregnancies is reported, the inflamed appendix was removed in the second gestation. Seventy-four cases occurred in III-parae.

PERIOD OF GESTATION.

The more advanced the gestation, the greater the probability of its interruption in the presence of appendicitis. It is hard to establish the exact age of a gestation; it is equally difficult to determine the age of the fetus at the time the symptoms of appendicitis first become manifest. Appendicitis occurs at all periods of gestation. In our collected cases, the maximal frequency was observed during the second (64 cases), third (83 cases) and fourth month (75 cases). It is rare in the last few weeks of pregnancy. The subjoined table shows the age of the pregnancy at

the time of operative relief of the appendicitis.

1st month	8	cases
2nd month	64	"
3rd month	83	"
4th month	75	"
5th month	44	"
6th month	42	"
7th month	23	"
8th month	25	"
9th month	11	"
10th month	5	"
Not stated	25	"

In case 12, an appendectomy was performed during the active stage of labor. The first day of last menstruation and the descent of the uterus in the thirty-eighth week indicated that the expectant date would lie between July 15th and 20th. The symptoms of appendiceal disturbance began on the 15th. On the same day, the patient began to complain of definite, infrequent and irregular girdle pains, beginning in the "small of the back" and migrating forward and downward to the hypogastrium. Examination revealed a beginning dilatation of the cervix. On the 17th, the appendix in the pre-perforative stage of gangrene and containing two drams of pus was removed. Nine hours after operation, labor was complete.

PATHOLOGY.

The appendix, in the gravid or non-gravid state, often presents variations in size, length, mobility, location and contour which are not without influence on the course of appendicitis. Not uncommonly, old or new inflammatory adhesions bind the appendix to contiguous organs; these adhesions may be so firm and so extensive as to make the operative procedure tedious and difficult. Chronic appendicitis is often productive of adhesions that interfere with the enlargement of the uterus, with its emergence from the pelvis, with the uterine contractions at time of labor. These adhesions play an important rôle in the etiology of oophoritis, abortion, subinvolution and extra-uterine pregnancy.

Associated conditions not infrequently occur. They antedate or complicate the appendicitis and aggravate the prognosis. Salpingitis, unilateral or bilateral, was noted by Jerlov[32] in at least 15 per cent of the cases; ovarian tumors: dermoid (37), papillary and other cysts (39) are not uncommon. Case 3 presented, in addition to the appendicitis and the gestation, an ovarian dermoid cyst four inches in diameter, containing sebaceous material, six teeth and some hair; case 7 presented a man's-head sized ovarian tumor. All varieties of ovarian tumor, dermoid cyst in particular, may complicate pregnancy. They call for immediate operative removal, because they increase the probability of abortion and may hinder delivery. Ovarian tumors and cystomata may be the seat of torsion, gangrene from pressure, rupture and suppuration and can determine accidents fatal to the mother and to the fetus[7].

Inflammation has manifold manifestations and various terminations. It terminates either in resolution, fibroid thickening, ulceration, suppuration or gangrene. An inflammation involving the whole thickness of the wall of a hollow viscus, such as the appendix, may result in perforation. Because inflamed appendices present various grades of inflammation, classifications based upon the preponderating lesion lack precision. When gangrene was the preponderating lesion, the appendicitis was classified as gangrenous; if a perforation existed the appendicitis was classified as perforative.

Many serviceable classifications of appendicitis have been proposed. We have adopted the following, though conscious of its shortcomings:

Acute catarrhal, with or without ulceration	108	cases
Acute suppurative without abscess formation	3	"
Acute suppurative with abscess formation	7	"
Acute suppurative with circumscribed suppurative peritonitis	70	"
Acute suppurative with diffuse suppurative peritonitis	28	"
Acute gangrenous	52	"

Acute gangrenous with abscess formation	1 case
Acute gangrenous with diffuse peritonitis	1 "
Acute perforative	5 cases
Acute perforative with gangrene	3 "
Acute appendicitis and acute gonorrheal salpingitis with peritonitis[5]	1 case
Chronic with adhesion formation	14 cases
Chronic without adhesion formation	11 "
Chronic: No mention made of the presence of adhesions	66 "
Too briefly reported	35 "

In the suppurative form, the pus was present either in the lumen of the appendix [12], in its wall or in the form of a peri-[23] or para-appendiceal[3] abscess. Several retro-cecal abscesses are reported[16]. "Large appendiceal abscess extending above to the naval and beyond the mid-line" [10]. The appendix may be adherent to the posterior abdominal wall[3], to the ascending colon[30], to the right adnexa and uterus[7], to the right tube[39], to the fetal cyst [25], to the omentum, intestine and tube[28], may be buried in inflammatory tissue[6], etc.

In operating on cases of appendicitis, one notices the presence of a peritoneal exudate, localized or diffuse, varying in quantity and in nature in different cases: Serous[29], serous with numerous flocculi[6], purulent[22], etc.

DIAGNOSIS.

Appendicitis occurring during gestation often offers diagnostic difficulties not present in the non-gravid state. Mild attacks are often misdiagnosed; they are mistaken for the digestive disturbances incident to the onset of pregnancy or for some of the other discomforts of gestation, such as can be caused by congestion of the ovaries, stretching of the uterine ligaments, etc.

According to the acuteness and duration of the symptoms presented by each individual case, 279 cases were acute and 91 chronic; in 35 cases, the reports are incomplete and do not permit exact classification.

The symptoms of appendicitis in the gravid state are those of the disease in the non-gravid state, with variations, determined by the age of the pregnancy, the fetal movements, the changed abdominal conditions, etc. Coincident pathological conditions modify and blur the clinical picture. Pyelitis (unilateral[37] or bilateral[36]), is reported as having coexisted in a few cases.

During pregnancy, especially from the fourth to the seventh month, pain in the right iliac region is common. Not infrequently it is due to traction exerted on peritoneal bands and adhesions by the enlarging uterus. The ascending uterus can displace the colon, cecum and appendix upward[32], six cases, forward and outward. The upward, forward or backward and outward displacement of the cecum and appendix occurs only in a fraction of the cases; it interferes with proper drainage of the appendiceal region and, in the later months of pregnancy, is of diagnostic and operative concern. Adhesions due to a previous inflammation bind down the appendix, limit its mobility and prevent its displacement. Abdominal pain must not be misinterpreted; its importance must not be misjudged. Pain and digestive disturbances call for proper recognition and interpretation. A patient should neither be subjected to the dangers of a needless operation nor deprived of the benefits of an indicated one. In appendicitis, the site of maximal pain and tenderness always corresponds to the location of the appendix[10, 12, 15, 19, 21, 24, etc.] If the latter be a pelvic organ, the site of the pain is pelvic; if an abdominal organ, the pain is abdominal.

In the non-gravid female, the appendix has been found in all parts of the pelvic and abdominal cavities; in pregnant women, variations of location are less uncommon. The appendix has been found in the right lumbar region[16], in the left side of pelvis [5], immediately beneath the liver[27].

The initial pain is felt in the upper abdomen or epigastrium[15]; in most cases, it becomes gradually localized to the location

of the diseased appendix[20], usually, the right iliac quadrant. In the acute forms, the pain is sharp and lancinating in character and frequently radiates down the right thigh. In the subacute and chronic forms, it is more of a constant dull ache. It may intermit.

The most reliable symptoms are: Localized pain, localized tenderness, and localized muscular rigidity over the region of the appendix, usually, the right lower abdominal quadrant. The symptoms: Fever, rapid pulse, chills[9], leukocytosis, nausea and vomiting are of less diagnostic value, because they are frequently absent in early cases, occur in many other disturbances incident to the period of gestation, and are characteristic only after the infection has begun to spread. If perforation occurs or pus collects, palpation usually detects a tumor mass. In appendicitis, abdominal pressure so made over the descending colon as to force gas toward the head of the cecum, increases the pain (Rovsing). It is most important to elicit a careful history and to obtain an accurate report of previous attacks. Patients who, prior to gestation, have had appendicitis treated non-operatively suffer, more or less, disturbance in the appendiceal region during pregnancy. One hundred and sixty-three cases gave a history of one or more previous attacks[3, 4, 6, etc.) The value of leukocytosis as a diagnostic aid is lessened by the fact that, in pregnancy, a leukocyte count up to 12,000 is not pathologic. Nevertheless a high leukocytosis with a high polymorphonuclear count, if associated with other symptoms of appendicitis, is very suggestive of the existence of the disease. We find reported a leukocytosis of 16,000 with 87 per cent polynuclear[32], of 18,000[18], of 22,000[24], of 23,500[22].

In the latter months of pregnancy, an early and correct diagnosis may prove, at times, very difficult, especially when the appendix is displaced immediately beneath the liver. Diseases of the gall-bladder, of the right kidney, of the stomach, of the liver, of the uterine adnexa simulate appendicitis and confuse the clinician. All these affections must be considered and excluded. In many cases the clinician must be satisfied with a probable diagnosis. Valuable time may be lost in attempting to make an exact differential diagnosis. Careful and repeated examinations of the catheterized urine from each kidney show the presence or absence of unilateral or bilateral pyelitis. In the presence of pyelitis, one notes pyuria, bacteriuria and sensitiveness to pressure of the affected kidney or kidneys.

If appendicitis be mistakenly diagnosed ectopic pregnancy or vice versa, the mistake is negligible as both conditions call for immediate surgical relief, the first step of which, in both cases, is abdominal section and inspection and palpation of the existing pathology. Exploratory laparotomy finds here an urgent indication.

When adnexal and appendiceal disease coexist, accurate diagnosis is more difficult. They may be of separate and independent origin or secondary one to the other; the pathological process extending by continuity or contiguity of tissue, or by lymphatic or vascular routes. Vagino-abdominal examination aids in differentiating a diseased appendix from adnexa the seat of inflammatory, cystic or neoplastic changes.

PROGNOSIS.

There is no fixed relation between the severity of the symptoms presented by the patient and the existing anatomical lesions; therefore, it is difficult to make an exact pre-operative prognosis as to fetal and as to maternal life.

Appendicitis is a dangerous disease. Many cases, apparently mild at the onset, prove fatal. The safety of the mother, be the case acute or chronic, is best assured by an early and immediate removal of the appendix and by non-interruption of gestation. It is universally admitted that early recognition and immediate operation holds forth a far better prognosis for the mother and for the gestation. Generally speaking, the less advanced the ges-

tation, the less likelihood of appendectomy being followed by interruption of pregnancy. Operate, if possible, before the occurrence of suppuration, gangrene or perforation and thereby forestall the development of serious complications. After the fifth month of pregnancy, the operative difficulties are increased: The uterus occupies the larger part of the abdominal cavity, suppuration is more frequent, adequate drainage is more difficult to secure. "Drainage was necessary; abortion followed two weeks after operation"[2]. In the appendicitis of the later periods of gestation, tympanitis, when present, interferes more with respiration and intestinal obstruction and is of not uncommon occurrence. There is increased vascularity and marked lymphatic dilatation of the peri- and para-appendiceal region; phlebitis and thrombosis are more prone to develop; the pus shows a tendency to burrow more widely and there is less likelihood of encapsulation. The omentum and small intestines in this later period cannot as easily protect the appendix.

During gestation, the prognosis of appendicitis is influenced by many factors. Other factors being equal, the morbidity of this condition is more varied and its mortality higher in the pregnant than in the non-pregnant. The pregnant female is an individual of lessened resistance to infectious and toxemic processes; this lessened resistance is most noticeable in the later period of pregnancy and in the presence of a virulent infection.

The pregnant uterus reacts unfavorably on the chronically inflamed appendix; likewise, an acutely inflamed appendix may so disturb the pregnant uterus as to induce abortion and thereby subject the patient to the combined morbidity of uterine abortion and appendiceal inflammation. Appendicitis may initiate abortion previous to, during or after the removal of the appendix. The mother and the fetus may live; the fetus may live and the mother die; the fetus may die and the mother live, or both may die; in some cases, the fetus may be dead previous to operation[32], and in some cases, the mothers have died undelivered[32].

Abortion may result from infection conveyed to the ovum either by the maternal blood or the lymphatic vessels, by the mucosa and submucosa of one or both tubes and the uterus. Abortion, induced or spontaneous, is always an aggravating factor.

The important difference existing between clinical recovery and anatomical recovery must not be ignored. It is that difference that impels us to advocate early operation. The efforts of the uterus to expel its contents may rupture encapsulated abscesses, tear adhesions limiting the spread of the infection and relight slumbering inflammatory processes. To avoid such disastrous accidents and the general peritonitis resulting therefrom, operate all your cases of appendicitis, and operate them early.

There were 32 maternal deaths. They can be attributed to the virulence of the infection, the advanced age of the pregnancy, the late recognition of the disease, the occurrence of abortion and premature labor, and, especially, the tardy and inappropriate surgical relief (8-month pregnancy, operation on 9th day after onset of appendicitis[25]; 7-month pregnancy[36]. The most common cause of death was diffuse peritonitis[10]. Case 26 was in the 8th month of gestation. She was delivered of a living but non-viable six-month infant four weeks after operation and died on the ninety-first post-operative day. One case[36] died on the forty-seventh post-operative day of acute pulmonary edema. In a patient[36] the blood showed, on the fifth post-operative day, streptococci hemolytici. She died on the sixth postoperative day. Some of the thirty-two deaths were due to complicating co-existing conditions: Placenta praevia totalis (child died during delivery)[18] and consequent hemorrhage.

Three hundred and seventy-three patients recovered from the appendicitis and

from the operation; they were restored to normal health. In the early months of gestation, a skilfully performed appendectomy is rarely followed by interruption of gestation. Abortion, miscarriage or premature labor are due either to some complication of the appendicitis or to some adventitious cause and may occur irrespective of the operation employed. With the advent of peritonitis or other serious complication, abortion is not improbable. In the later months, it is difficult to avoid disturbing the uterus, and the operation may contribute to the untimely termination of the pregnancy. Operation does not jeopardize the mother's life; appendicitis does.

In the twenty-one cases of ectopic pregnancy, the products of conception and the appendix were removed at the same operative sitting. In two hundred and five cases, despite the operation, the appendicitis and its complications or sequelae, a living child was born. In eleven cases, including one[11] in which cesarean section and appendectomy were performed at the same sitting, no mention is made of the state or viability of the child.

Premature labor, the expulsion of a fetus at or after the age of viability, is recorded in seventy-one cases. It may occur on the day of operation, on the day following[15], several days later or "four weeks after operation"[26]. A few were induced by the medical attendant for syphilis, pelvic contraction, albuminuria[9, 32], etc. Most always, the premature labor was spontaneous, being due, in part, either to the operation, the infection, some associated pathological condition (Ovarian cyst—[39]—; nephritis, pyelitis—[36]—, etc.), or to the combination of various factors. In almost all of the premature labors, the baby died. "Baby died from apnea"[12]; "infant lived but twelve hours"[16]; "child died after a few respiratory movements"[22]. Jerlov[32] records nine living children in fifty-two interrupted gestations following appendectomy.

In ninety-two cases, either abortion or miscarriage followed, earlier or later, the operation. It is most always a clinical manifestation of severe maternal infection and therefore is more frequently observed after late operation and in individuals of lowered resistance. In septic abortion cases, the raw uterine cavity and its thrombosed gaping vessels increase the dangers of spreading infection. Some cases aborted shortly after operation: 12 hours (30), second day (5), on the fourth day (10), five days (37), others, as long as two weeks (2), etc. Case 5, eight weeks pregnant, was operated at one sitting for acute gonorrheal salpingitis. She did not wish the gestation to continue. She miscarried after being discharged from the hospital. In case 8, fifteen days after operation, a five-month fetus was expelled. There coexisted an appendicitis and a massive fibroid encircling the lower half of the uterus and extending up to the umbilicus.

TREATMENT.

Be the patient pregnant or nonpregnant, the curative treatment of appendicitis is operative in nature. Palliative measures have a wide field of usefulness, but only as pre- and post-operative adjuvants. We know of no valid contra-indication to operative treatment. Women of child-bearing age who have had one or more attacks of appendicitis non-operatively treated, should, at the earliest possible time, submit to removal of the appendix. A pregnant woman whose metabolism is normal is a good surgical risk.

The importance of early and timely operation cannot be overemphasized. The appendix should be removed before it has ruptured. The earlier the appendectomy, the less advanced the pathology, the greater the probability of the patient's uneventful recovery. It is not possible to foresee the outcome of a non-operatively treated appendicitis, therefore the wisest course is to remove the diseased appendix, if feasible. Delay in operating permits the development of complications that are beyond the

control of the surgeon. It has often proven disastrous. In cases of suspected appendicitis, do not wait for a positive diagnosis. When in doubt, you are amply justified in performing an exploratory laparotomy, exposing the appendix and removing it. If a condition amenable to surgical correction is encountered, the exploratory laparotomy is serviceable. The harm resulting from the removal of a healthy appendix is negligible.

Interruption of gestation has no place in the treatment of appendicitis complicating uterine pregnancy. The surgeon should remove the diseased appendix, reduce to a minimum all intra-abdominal manipulations, and see that the gestation be undisturbed. Prolonged traumatizing search for the appendix is to be avoided. Should the delivery of the appendix entail the tearing of protective adhesions and the spreading of the infection, limit the operative procedure to drainage of the appendiceal and other infected regions.

Appendicitis complicating gestation presents to the clinician two paramount indications: The removal of the diseased appendix and the non-interruption of gestation. The attendant should strive to have the pregnancy continue undisturbed. It will not be amiss to tell the patient that, despite the operation, abortion or premature labor may occur, but that it is more probable if the case be treated non-operatively. The probability of cessation of gestation increases with the severity of the infection.

Previous to ascertaining by inspection the nature and extent of the diseased process, one cannot decide what operative procedure is indicated in the case at hand. Operate as rapidly as consistent with the indications and the patient's safety. Reduce all handling of the abdominal organs to a minimum.

If, despite all precautions, post-operative abortion occurs, endeavor to secure the spontaneous emptying of the uterus by tamponade, quinine, pituitrin, etc. Avoid all needless manipulation and instrumentation of the uterus.

Appendectomy is almost always an emergency operation; its technique is simple and easy of execution. Any physician of ordinary experience and skill should be conversant with its performance. When feasible, the center of the incision should correspond to the point of maximal pain and tenderness. We frequently employ the gridiron incision, well to the side. The muscles are split, not cut; thus the abdominal wall is not weakened and is able to withstand the distention incident to pregnancy and the muscular strain accompanying labor.

Septic complications tax the diagnostic and therapeutic skill of the doctor. They prolong convalescence, and often put the already weakened resistance of the patient to a severe test. In complicated cases, the incision must, of necessity, be longer, the trauma is greater, and the post-operative shock more marked than in cases of moderate severity.

Appendicitis occurring within several days of the expected time of labor, influences the obstetrician's choice of method of delivery. It may be necessary to resort to vaginal or abdominal cesarean section. The co-existence of complicating conditions—an exhausted mother, a contracted pelvis, placenta praevia—may require unusual measures.

The removal of the uterus is a needless mutilation and is never indicated in well-managed cases. Hysterectomy, complete or incomplete, is a difficult operation and should not be undertaken by one of limited surgical experience.

The authors refer to drainage in 188 cases: It was used in 119 and omitted in 69 cases. Some operators used cigarette drains[11], a few, rubber tubing[12], others, a glass tube[18], and many, wicks of gauze. Drainage, when indicated, is serviceable. It has disadvantages; it has dangers. Its indiscriminate use is to be condemned. The

enlarged uterus makes the maintenance of adequate drainage difficult. It must be discontinued as soon as the discharge becomes scanty and serous. The gauze, glass or rubber tubing, cigarette drain, or other agents of drainage should not impinge, should not irritate the uterus. Its use is always indicated in para- and peri-appendicular abscesses, in suppurative peritonitis, localized or diffuse, and whenever the peritoneal exudate is copious. The use of drainage, at times, leads to adhesion formation; intestinal obstruction[14] may result therefrom. Other objections are that it is occasionally followed by a fecal fistula[15], by a post-operative hernia[2, 4], etc. If in doubt as to the need of drainage, do not drain.

In 243 cases, the time of operation, with reference to the onset of illness, is not stated. In the remaining 162 cases, it can be tabulated as follows:

Time of operation after onset of illness	Number of cases	Number of maternal deaths	Abortions of premature labor
Within 24 hours	36	1	7
Within 48 hours	35	1	16
Within 72 hours	77	26	43
From the 4th day to the 6th day, incl.	8	1	1
On 9th day of disease	2	2	2
On 10th day of disease	2	0	0
One month later	2	0	0
Total	162	31	69

The above table demonstrates the importance of early and timely operation from both the maternal and the fetal standpoint. Early operation curtails the morbidity and is rarely followed by death of the mother. Involvement of the internal genitalia in the appendiceal inflammation predisposes to abortion.

The operative procedures resorted to admit of the following tabulation:

IN THE UTERINE PREGNANCIES.

	Cases	Deaths	Abortions or premature labors
Appendectomy	371	32	159
Appendectomy and removal of an ovarian tumor	3	0	2
Appendectomy and caesarean section	1	0	0
Appendectomy and vaginal section	1	0	0
Appendectomy and removal of one tube, or of one tube and ovary	5	0	1
Appendectomy and sub-total hysterectomy	1	0	1
Total	382	32	163

IN THE EXTRA-UTERINE PREGNANCIES.

	Cases	Deaths
Appendectomy and removal of fetal sac and tube and ovary of corresponding side at same sitting	20	0
Appendectomy; 7 days later removal val of ectopic sac	1	0
Total	21	0

Some of the patients were operated under local anesthesia, some under splanchnic and local anesthesia combined[18], others under spinal anesthesia[23], and almost all were subjected to general anesthesia, such as gas oxygen[11], ethylene[24], chloroform[12] and ether.

Most of the cases, with few exceptions, made an uneventful recovery. In one case[10], the patient aborted on the fourth post-operative day and had a stormy convalescence. "During the twelve weeks of her stay at the hospital, she had pyelitis on both sides, first on the right and then on the left. She had phlebitis in the femoral and popliteal veins, first on the left side, then on the right. She was very ill several times during her long sepsis; but a secondary laparotomy with good nursing and with repeated irrigations of the kidney pelves through the ureteral catheter finally saved her. After six months, she has regained her color and her weight and is in perfect health."

BIBLIOGRAPHY.

1. McGlinn: N. Y. M J., 104:248. 1916.
2. McLean: Texas State J. M., 12:296. 1916.

3. Doyle: Am. J. Obst., 74:849. 1916.
4. Jennings: J. Florida M. A., 3:82. 1916.
5. Tracy: Penn. M. J., 19:826. 1916.
6. Tate: Lancet-Clinic, 105:133. 1916.
7. Veit: Med. Klin., 12:85. 1916.
8. Tate: Am. J. Obst., 77:235. 1918.
9. Dawes: Illinois M. J., 33:171. 1918
10. Bunch: J. S. Carolina M. A., 14:250. 1918.
11. Cocke & Mason: J. A. M. A., 75:95. 1920.
12. Grattan: Surg., Gynec. & Obst., 29:457. 1919.
13. Hoffmann: Arch. f. Gynaek., 112:230. 1920.
14. Buford: W. Virginia M. J., 15:335. 1921.
15. De Lee: S. Clinics N. America, 1:1003. 1921.
The Principles and Practice of Obst., 1924, p. 527.
16. Paulus: J. Oklahoma M. A., 14:14. 1921.
17. Couvreux: Progrès Médical, 1922, p. 459.
18. Szenes: Arch f. klin. Chir., 120:859. 1922.
19. Favreau et Chaput: Progès Méd., 1923, p. 133.
20. Anderson: Nebraska M. J., 8:102. 1923.
21. Gore: Southwestern Med., 8:383. 1924.
22. Pribram: Kiln. Wchnschr., 1:1256. 1922.
23. Le Filliatre: J. de méd. de Paris, 44:140. 1925.
24. Ficklen: New Orleans M. and S. J., 78:146. 1925.
25 Caplesco: Bull. et mem. Soc. nat. de chir., 51:949. 1925.
26. Hipsley: Med. J. Australia, 12:2400. 1925.
27. Stolper: Wiener med. Wchnschr., 75:1370: 2334. 1925.
28. Crosthwait: Texas Medical News, 25:337. 1915-16.
29. Richardson: Guy's Hosp. Gaz., 30:403. 1916.
30. Markoe: Der Frauenarzt, 33:186. 1918.
31. Brindeau: La Clinique, 11:1. 1920.
32. Jerlov: Acta Gynecologica Scandinavica, 4: Fasc. 1. 1925.
33. De Gironroli: Deutsche Zeitschr fuer Chir. 175:313. 1922.
34. Tedenat: Bull. Soc. d'Obst. et de Gynec. de Paris, 14:237. 1925.
35. Lemeland et Risacher: Bull. Soc. d'Obst. et de Gynec. de Paris, 15:29. 1926.
36. Royston and Fisher: Am. J. Obst. and Gynec., 11:184: 247. 1926.
37. Fullerton: Ohio State M. J., 22:124. 1926.
38. Mussey: Collected Papers of the Mayo Clinic, 9:293. 1917.
39. Heineck: Personal Cases.

REVIEWS

THE ETIOLOGY OF PERNICIOUS ANEMIA.*

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NEW ORLEANS.

Modern conceptions regarding the etiology of pernicious anemia may be broadly grouped as: (A) A theory of gastro-intestinal infection of toxemia; and, (B), A theory of dietary, perhaps vitamin, deficiency.

(A) *The theory of gastro-intestinal infection or toxemia.*

In 1889, William Hunter[1] emphasized the presence, frequently early, of glossitis in pernicious anemia and expressed the view that oral sepsis is most likely responsible for this disease. His finding of marked siderosia in the liver led him to propound the theory that excessive blood destruction occurred in the portal area as the result of gastro-intestinal toxemia or infection.

In the thirty-eight years ensuing since Hunter's utterance, a good deal of evidence has accumulated to support this theory and today his conception, in a somewhat modified form, has numerous advocates.

THE SIGNIFICANCE OF ACHLORHYDRIA.

The one most striking phenomenon which has been shown to be almost invariably present in pernicious anemia is the absence of the free hydrochloric acid of the stomach. Of 1141 cases of pernicious anemia or subacute combined degeneration of the cord examined by various investigators (Ewald,[2] Zadek,[3,4] Lavine and Ladd,[5] Hurst,[6] MacBride and Carmichael[7]) all but 27 showed the absence of free hydrochloric acid and of these latter cases the diagnosis of pernicious anemia was confirmed at autopsy in only 5.

Bloomfield and Keefer[8] have shown that this is a true anacidity (pH 6.0 to 7.0) and that acid is not secreted after stimulation with histamin. Furthermore, of all the symptoms and signs of pernicious anemia, this is the one single sign which persists unchanged even in very long remissions

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(Hurst[9]). Even the remarkable effects of "liver diet" in producing an apparently complete remission have failed to bring back the acid secretion.[10] On the other hand, Hurst has shown that achlorhydria not associated with pernicious anemia may show, in some instances, some degree of reversibility.

What is probably a still more significant feature as regards etiology is the fact that this achlorhydria appears to precede the onset of the disease. Faber and Gram[11] have reported four cases in which the achlorhydria preceded the definite onset of the disease by from three to twelve years. Nine other such cases have been reported (Sturtevant,[12], Mouzon,[13] Montgomery,[14] Carey[21]), and that more than this number have not been reported can at least in part be explained by the relative infrequency of the performance of a gastric analysis unless indicated by the incidence of the symptoms of the disease.

The cause of the achlorhydria is problematical. In a number of cases Hurst[6] believes the achlorhydria is constitutional, "an inborn error of functional activity independent of anatomical changes in the mucous membranes." He considers that 16 per cent of individuals with constitutional achlorhydria ultimately develop pernicious anemia.[9]

Recently a good deal of attention has been focused on the familial or hereditary incidence of pernicious anemia. Thus, Levine and Ladd[5] found a familial incidence in nine of 150 cases or 6 per cent. Klein,[16] Cabot,[17] Patek,[18] Gulland and Goodall,[19] Wilson,[20] Carey,[21] and Maclachlan and Kline[22]—to mention only a few from an ever increasing literature — record instances of from two to eleven cases of pernicious anemia occurring in the same family.

The underlying finding in all these examples of familial pernicious anemia seems to be a familial occurrence of achlorhydria. Weinberg[23] examined twenty-four relatives of twelve patients suffering from pernicious anemia. Of those examined twenty-two were children and two were adults. Nine of the children and one of the adults had achlorhydria. One of the patients had four children and in three of these achlorhydria was present. Todd[24] and Dorst[25] quote other interesting examples of the familial incidence of achlorhydria associated with familial pernicious anemia.

Hurst considers that the achlorhydria may also be secondary, and records cases of pernicious anemia following achlorhydria resulting from alcoholic gastritis and from carcinoma.[26]

A statistical survey of the incidence of pernicious anemia in Western Canada by Montgomery[14] revealed the curious fact that whereas certain localities reported only occasional cases of pernicious anemia, other localities of equal population furnished a very large percentage of cases. These cases, moreover, occurred among the Anglo-Saxon population who had resided in these districts for many years (twenty years or longer) and never among the more recently settled Scandinavian immigrants.

A notable feature of the "high incidence" districts in Western Canada is the fact that they are the districts where, as the result of geological formations, the drinking water contains a very high concentration of the alkaline earths. A natural hypothesis suggested by this discovery is that the continued drinking of alkaline water over a long period of years leads to achlorhydria and thus the avenue is opened for infection leading to the development of pernicious anemia. With the object of investigating the validity of such an hypothesis, the writer examined a number of apparently healthy old time residents, varying in age from 30 to 60 years, and of both sexes, in both a "high" and "low incidence" district. In a village of 400 population, which had reported six cases of pernicious anemia within five years, and where the water contains a very high proportion of alkaline earths, a very high incidence of hypochlor-

hydria and achlorhydria, as well as the mild diarrhea often associated with insufficient gastric acidity, was found. On the other hand, in a district where the disease was exceedingly rare and the water good, hyperacidity, constipation, and piles were much more common.

Conclusions of course cannot be drawn from these findings as they are the result of the examination of only 84 individuals. However, they tend to confirm the conception that water supply may be an important factor in the production of achlorhydria in districts where pernicious anemia is endemic.

The effect of the achlorhydria may be briefly summarized:

(1) Gastric digestion is impaired and this permits unsoftened and hard particles of food to pass into the small intestine. Zadek[4] found (in 200 cases) frequent inflammation and atrophic processes in the stomach and intestines. Hanke and Koessler,[27] in their work on toxic amines, showed that the intestinal tract frequently contains very large doses of poisons which are probably rendered physiologically inert in the passage through the intestinal wall, which, they found, takes a most active part in the chemical processes that render these potent substances harmless. As the result of achlorhydria, the intestinal wall may be injured and its normal viability and impermeability lost.

(2) Incomplete protein metabolism as the result of the absence of hydrochloric acid permits an undue proportion of food residue to remain in the lower ileum in a form readily prone to bacterial decomposition. Furthermore, toxic split-protein products may be formed as the result of incomplete digestion.

(3) The pH of the normal stomach may vary from 1.2 to 7.0. Knott[28] has shown that the gastric juice is a strong antiseptic and that an acidity of pH 4.0 will kill many strains of B. coli and streptococcus. Arnold and Brody[29] found that in normal individuals the reaction of the duodenum varies from pH 4.0, after outpouring of the gastric juice, to pH 8.0 when nothing is passing the pylorus. In achlorhydria the reaction of the duodenal contents remains continuously very close to neutrality, the periodic waves of acidity having disappeared.

The absence of the bactericidal barrier in the stomach, therefore, may not only permit organisms to enter the upper bowel, but what is more important, may permit them to grow and multiply in this highly absorptive portion of the gastrointestinal tract on account of the continuous absence of acidity.

Knott[31] found that in over 90 per cent of cases showing normal amounts of free hydrochloric acid in the gastric juice, the resting duodenal contents were sterile, whereas the corresponding specimens in achlorhydria were always teeming with live bacteria. Van der Reis,[32] and Bogendorfer and Bucholz[33] found fecal types of bacteria normally present only in the lower ileum and large bowel, growing in the upper part of the small intestine in pernicious anemia.

There is, thus, a good deal of a priori evidence to suggest that achlorhydria permits chronic infection of the upper bowel to take place. It is natural to inquire, however, why do not all individuals with achlorhydria develop pernicious anemia? Functional achlorhydria has been found to exist in 4 per cent of normal students[9] and achlorhydria is frequently associated with other diseases such as malignancy, cholecystitis, chronic gastritis, and neurosis.

In attempting to solve this question, the findings of Bloomfield and Keefer, previously quoted, should be noted: namely, that such a condition of true anacidity as is found in pernicious anemia is relatively rare, and the pH of the gastric contents of the normal individual with so-called "anacidity" is frequently just below the end point of dimethyl. In such individuals an

acid barrier is therefore still present. Furthermore, individual resistance and immunity varies. It is well known that, of a number of individuals exposed under exactly the same conditions to a disease, some will develop the disease while others may remain immune. Variation in the toxin destroying powers of the intestinal wall, or an inherent hereditary susceptibility of the bone marrow may be present. Piney[30] considers that the primitive myeloblastic tissue, which normally atrophies, persists in certain individuals and various agents capable of producing a secondary anemia in ordinary persons, will produce pernicious anemia in such individuals as possess the necessary remnant of megaloblastic tissue.

POSSIBLE CAUSATIVE ORGANISMS.

Hurst suggests that in pernicious anemia there are three toxins, namely (1). a neurotoxin; (2). a hemotoxin acting directly on the bone marrow; and (3) a hemolysin. These may be produced synchronously or one at a time. Remissions are due to the development of a certain degree of immunity towards the "infection." This author believes that there is a definite infection of the intestinal tract with a hemolytic streptococcus (streptococcus longus).[6] He found this organism frequently present (77.5 per cent of 40 cases) in the duodenum of patients suffering from pernicious anemia or subacute combined degeneration of the cord and much less often in a series of controls (20 per cent of 145 normal individuals) where the organism, when found, was scanty and slow growing.

Grinker[34] rejects this theory on the grounds that a streptococcus, if existing in the bowel a long time, should produce lesions. In reply, it may be pointed out that this organism may grow in the lower bowel without producing lesions. That it does no harm there may be explained by the fact that there is little absorption from the lower as compared with the upper bowel.

Continental investigators favor B. coli as an etiological agent.[31] Their finding of this organism numerically increased and absolutely predominant in the intestine in pernicious anemia; the decrease in the number of these organisms during remissions[32] the fact that B. coli is known to produce a neurotoxin and a hemolysin,[24] the similarity of the reaction of the hemopoietic system to a related organism (typhoid—splenomegaly, leukopenia, relative lymphocytosis); and the reported ability of this organism to produce hemolysins by its action on proteins (Iwao); are all suggestive. Experimental work, [24, 31] has so far not been convincing.

In America more attention has been paid to B. Welchii, an organism which is capable of producing an exotoxin, a hemolysin, an irritating acid, and neurotoxic substances.[36] This organism has been found in increased numbers in the stools of cases of pernicious anemia,[36] but this has also been shown to be true of the stools of achylic individuals suffering from secondary anemia.[37] Nye found no definite relationship between the spore counts in pernicious anemia and the clinical condition of the patient (remission or relapse) and suggests that the increase in the number of B. Welchii spores is the result of the tendency of this organism to form spores in alkaline media. Normal stools contain at least as many, probably more, vegetative forms of B. Welchii as stools from cases of pernicious anemia and achylia.

Experimental inoculation of B. Welchii toxin[38, 29] or of the virulent organism[40] has been reported to produce an anemia and Cornell, by feeding the organisms to animals, produced degenerations in the nervous system as well as "a pernicious type" of blood picture. Reed, Orr, and Burleigh[41] report the production, by inoculation, of a hyperchromic anemia with anisocytosis, of which the quantitative examination by the method of Price-Jones[42] showed that it resembled that of pernicious anemia.

Wood[43] has emphasized the relation between sprue and pernicious anemia. By feeding guinea pigs with monilia psilosis,

he was able to produce a hemolytic anemia with preponderance of oversized red blood cells and striking polychromatophilia. Scott Warthin,[44] however, was unable to confirm this.

Experimental work to support the theory of gastro-intestinal infection is somewhat meager. Only two instances of pernicious anemia[45, 47] and one of subacute combined degeneration of the cord[46] following complete gastrectomy—an artificially produced achylia—have been reported. Several investigators[48, 49, 50] have reported the incidence of an anemia of the pernicious type in cases of chronic stenosis of the lower ileum leading to the growth of fecal type organisms in the upper bowel, and in 10 cases of pernicious anemia Seyderhelm[51] noted rapid improvement when enterostomy was performed, followed by relapse when the opening was closed.

Some experimental work by Seyderhelm[52] is interesting in this connection. He produced a stricture 10 to 20 cm. above the ileo-cecal valve in ten dogs. Two of the animals developed hyperchromic anemia with megalocytis, anisocytosis, and urobilinogenuria. On autopsy an abundant colonic type of flora was found above the stricture, hemosiderosis in the liver and spleen, and megaloblastic reaction in the bone marrow. In the dog which did not develop anemia, the abundant colonic type of flora was absent above the stricture.

A toxin has not as yet been isolated from the small intestine of pernicious anemia patients. Recently Macht[53] in testing the toxicity of various blood sera to plants found the blood serum of patients suffering from pernicious anemia definitely toxic.

THE PRESENCE OF A TOXIN.

That the "pernicious type" of blood picture, formerly thought to be so specific and even diagnostic of pernicious anemia, may be associated with a number of other conditions, is becoming evident as various diseases are studied in more detail. The method of Price-Jones[42] for measuring the size of blood cells has proven to be of great value in more accurately defining the type of blood picture characteristic of pernicious anemia and yet, even the characteristic "Price-Jones curve" is occasionally found in association with other diseases.

Thus, it is now well known that a certain number of persons harboring dibothriocephalus latus may develop a symptom complex and blood picture so like that of pernicious anemia that at times differentiation may only be possible by the discovery of the parasite.

In most cases, expulsion of the worm is followed by a clearing up of the symptoms and the blood picture. In those cases in which the expulsion of the worm is not followed by complete recovery, the usual explanation is that the morbid processes have progressed so far that a restitution of the degenerative changes has become impossible. It was believed that a strongly hemolytic cholesterol ester of oleic acid is produced by the worm and absorbed from the intestinal tract. Even though experimental work with extracts of the worms and with lipoids from other sources has failed to reproduce the anemia, it is still quite probable that the anemia is the result of the activity of the parasite in the intestine.

Martland[54] and many French writers (Weil, Lacassagne, Mottram, Brule) have shown that prolonged exposure to the rays of radio-active substances (radium, thorium, mesothorium) produces an erythroblastic bone marrow and a hyperchromic anemia with large cell anisocytosis, megaloblasts, and leukopenia. Martland has shown that continued exposure to the emanations of these substances for many years (e. g. dial workers) leads to actual deposits of radio-active substances in the spleen, bones, and liver in close proximity to the erythroblastic and leukoblastic centres with a resulting constant irritation. Similarly, he points out, "In the etiology of obscure blood diseases it might be easy to conceive of various bacterial and cellular toxins in minute amounts, ultramicroscopic organisms, or bacteriophages, producing similar

general or selective action on the hematopoietolytic system."

The occurrence in sprue of a hemolytic hyperchromic anemia with preponderance of oversized red cells in association with a chronic course marked by glossitis and various gastrointestinal symptoms and punctuated by remissions and relapses, has frequently led to difficulties in the differential diagnosis between this disease and pernicious anemia. Even the Price-Jones curve may approximate that found in pernicious anemia. If the conception that sprue is caused by gastro-intestinal infection (e. g. by Monilia psilosis) be correct, it is possible that a similar, though not necessarily the same, factor is responsible for the development of pernicious anemia.

In the latter part of pregnancy or in the early puerperium, a hyperchromic anemia with leukopenia, relative lymphocytosis and abnormal red blood cells may occur[55, 56] together with sore mouth, gastro-intestinal disturbances, splenomegaly, tingling, and even achlorhydria. This is a crytogenic type of anemia not associated with sepsis, hemorrhage, or other complication, and these are not cases of pregnancy supervening in persons already suffering from pernicious anemia. The condition is not always fatal, transfusion being remarkably beneficial and improvement often following expulsion of the fetus. As the cause of this anemia the working of a syncytial hemolysin or some relation to the toxemias of pregnancy have been suggested.

Further suggestive evidence that pernicious anemia is produced by a toxin may be derived from the fact that the symmetrical lesions found so characteristically in the cord in pernicious anemia may also arise in the course of toxic processes due to poisoning with lead, arsenic, ergot, alcohol (chronic); and in pellagra, diabetes, leukemia, cancer, chronic jaundice, tuberculosis, syphilis, diphtheria, malaria, influenza, scarlatina, tetanus, typhoid, and pregnancy. That these lesions found in the cord in pernicious anemia cannot be the result of the anemia per se, is proved by the fact that they may be present before anemia sets in and are never found even with the severest grades of secondary anemia.

(B). *Theory of Dietary, Perhaps Vitamin, Deficiency.*

The remarkable results produced by the Minot and Murphy "liver diet," based on the experimental work of Whipple and his associates, has stimulated along new channels speculation and investigation regarding the etiology of pernicious anemia.

Investigating the nature of the reaction produced by this diet, Murphy, Monroe and Fitz,[57] in ten typical cases of pernicious anemia on the Minot and Murphy regimen, found the diet to cause the delivery into the circulation of new, young, red blood cells, as evidenced by a prompt increase in reticulocytes. At the same time there was a marked decrease of bile pigment concentration in the serum. Medearis and Minot[58] found that the measurement, by the method of Price-Jones, of the red blood cells of pernicious anemia patients on this diet showed a normal, or below normal mean and median cell diameter, whereas the return to normal of the red blood cells of patients in "spontaneous remission" (i. e., not as the result of liver therapy) was not so marked.

According to Brill[59] the results of the liver diet are specific for pernicious anemia and this method of treatment is of little value in secondary anemias.

Just why this diet has proven to be so valuable is still an open question. Whipple has suggested that in pernicious anemia a disease of the stroma forming cells of the marrow exists, or a scarcity of material from which the stroma of the red blood cells is formed, is present. The disturbed pigment metabolism may be due to an overstimulation resulting in more pigment being formed than can be used.

Koessler, Maurer and Loughlin[60] have propounded a theory of vitamin deficiency as the cause of pernicious anemia. These

authors suggest that there is a long standing deficiency in vitamin A (and perhaps B and C) due to chronic underfeeding with these essential foodstuffs for a period of many years or due to deficiency of their utilization. They explain the blood changes as being due to vitamin A underfeeding; the nervous symptoms to an absence or deficient quantity of vitamin B (compare the paraesthesias and combined sclerosis of the cord in pellagrins, the polyneuritis in beriberi); the tendency to hemorrhages, to partial or complete lack of vitamin C. Their experiments show that blood regeneration cannot take place without the presence of vitamin A.

Basing their therapy on such a theory, Koessler and Maurer[61] were able to produce a prolonged remission in 42 patients suffering from pernicious anemia by feeding a high vitamin, high caloric diet, furnishing the meats chiefly in the form of liver, kidney, and other edible viscera.

The item of great difference between the diets of Minot and Murphy and that of Koessler and Maurer consists in the amount of fat given. The former investigators exclude fats as far as possible on the grounds that blood destroying properties are present in certain substances derived from fats, and because excess of fats in the diet may favor intestinal putrefaction. Koessler and Maurer, on the other hand, include a large amount of fat because it is an important source of vitamins. A rather instructive fact is that both groups of investigators have reported very favorable results.

The work of Simmonds, Becker, and McCollum[62] may offer a new interpretation for the remarkable results produced by the liver diet. These workers have shown that vitamin E, which is abundantly found in liver, is in some way associated with iron assimilation and suggest that its deficiency results in the impaired iron metabolism which is so characteristic of pernicious anemia.

Minot and Murphy,[63] as well as Koessler and Maurer[61] claim that the history of patients suffering from pernicious anemia frequently suggests a faulty mode of nourishment, deficient in essential foodstuffs, over a long period of years. On the other hand, in a detailed study of the pre-disease diets consumed by tewnty-six patients with pernicious anemia over a period, especially, of ten years before coming ill, Cornell[64] found that on the whole their diets in most cases were the same as those of their nearest associates who did not develop pernicious anemia.

The theories of gastro-intestinal infection and dietary, perhaps vitamin, deficiency, have been discussed separately, but they are supplementary in many respects rather than the antithesis of one another. The successful use of the liver diet appears to indicate that some essentials to the normal metabolism of the body—essential to the life of nervous tissue as well as for proper blood metabolism—are wanting in pernicious anemia. These essentials appear to be supplied in the liver diet. That the body is deprived of these as the result of chronic infection is quite conceivable.

SUMMARY.

1. *Achlorhydria gastrica* is constantly present, precedes the onset of symptoms, and is probably an essential predisposing factor in the etiology of pernicious anemia. The achlorhydria may be constitutional or secondary. The drinking of highly saline alkaline water for a long period of years has been suggested as a factor in its production, while the familial incidence of achlorhydria may explain the occasional familial occurrence of pernicious anemia.

2. The acid of the gastric juice appears to act as an antiseptic protective mechanism both for the stomach and, by means of intermittent waves of acidity, for the upper bowel. Under favorable conditions various organisms may, in the absence of acid, be permitted to grow and form toxins in the highly absorptive upper bowel. No specific organism has yet been shown to be related etiologically.

3. Both the hemic and the nervous manifestations of pernicious anemia are found in connection with other diseases and therefore, as in these or other diseases, may be the result of chronic infection or intoxication.

4. The successful use of a high coloric diet rich in vitamins, iron, and purin derivatives, may be due to the supplying of material essential to normal metabolism and deficient or absent as the result of improper diet or inefficient utilization of a normal diet as the result of achlorhydria and infection.

BIBLIOGRAPHY.

1. Hunter, Brit M. J.: 1:784, 1887.
2. Ewald Spezielle Path. und Therapie, 8:1216, 1920.
3. Zadek: Berl. klin. Wchnschr., 58:1213, 1921.
4. Zadek: Klin. Wchnschr., 5:1331, 1926.
5. Levine and Ladd: Bull. Johns Hopkins Hosp. 32:254, 1921.
6. Hurst: Brain, 48, part 2:218, 1925.
7. MacBride and Carmichael: Proc. Roy. Soc. Med. (Neurol. Sect.), 1925.
8. Bloomfield and Keefer: J. A. M. A., 88:707, 1927.
9. Hurst: Brit. M. J., 1:93, 1924.
10. Minot and Murphy: J. A. M. A., 89:759, 1927.
11. Faber and Gram: Arch. Int. Med., 34:658, 1924.
12. Sturtevant: J. A. M .A., 85:1638, 1925.
13. Mouzon: Presse med., 34:807, 1926 .
14. Montgomery: Canad. M. A. J., 16:244, 1926.
16. Klein: Wien. klin. Wchnschr., 4:721, 1891.
17. Cabot: Pernicious Anemia, in Osler and McCrae: A System of Medicine, Phila., Lea & Febiger, 1908.
18. Patek; J. A. M. A., 56:1315, 1911.
19. Gulland and Goodall: The Blood, London, W. Green & Son, 1912.
20. Willson: J. A. M. A., 59:267, 1912 .
21. Carey: Minnesota Med., 9:385, 1926.
22. Maclachlan and Kline: Am. J. Sc., 172:533, 1926.
23. Weinberg: Deutsch. Archiv. f. klin. Med., 126:447, 1918.
24. Todd: Brit. M. J., 2:180, 1926.
25. Dorst: Am. J. M. Sc., 172:173, 1926.
26. Hurst: Guy's Hosp. Rep., 76 287, 1926.
27. Hanke and Koessler: J. Biol. Chem., 59:899, 1924.
28. Knott: Guy's Hosp. Rep., 73:429, 1923.
29. Arnold and Brody: Jour. Infect. Dis., 38:672, 1926.
30. Piney: Proc. Roy. Soc. Med., 18, part 3 (Sect. Path.): 5, 1924-5.
31. Knott: Guy's Hosp. Rep.,77:1, 1927.
32. Vand der Reis: Klin. Woch. and Chir., 35:296, 1923.
33. Bogendörfer and Bucholz: Quoted in Presse Med., 34:807, 1926.
34. Grinker: Arch. Int. Med., 38:292, 1926 .
36. Moench, Kahn & Torrey: Jour. Infect. Dis., 37:161, 1925.
37. Nye: Jour. Clin. Investigation, 4:71, 1927.
38. Moench, Kahn, & Torrey: Proc. Soc. Exper. Biol. & Med., 23:8, 1925.
39. Patterson and Kast: Proc. Soc. Exper. Biol. & Med., 23:171, 1925.
40. Cornell: Canad. M. A. J., 15:26, 1925.
41. Reed, Orr, & Burleigh: Canad. M. A. J., 16:525, 1926.
42. Price-Jones: J. Path. & Bact., 25:487, 1922.
43. Wood: Am. J. M. Sc., 169:28, 1925.
44. Warthin: Ann. Clin. Med., 5 808, 1927.
45. Moynihan: Lancet, 2:430, 1911.
46. Ellis: Proc. Roy. Soc. Med., 18 (Sect. Neurol): 27, 1925.
47. Hartman: Am. J. Sc., 162:201, 1921.
48. Haden: J. Lab. & Clin. Med , 11:454, 1926.
49. Chapman & Duff: Brit. M. J., 11:902, 1926.
50. Croft: M. J. & Record, 123:575, 1926.
51. Seyderhelm: Klin. Wchnschr., 3:568, 1924.
52. Seyderhelm, Lehmann & Wichels: Klin. Wchnschr., 3:1439, 1924.
53. Macht: J. A. M. A., 89:753, 1927.
54. Martland, Conlon, & Knef: J. A. M. A., 85:1769, 1925; Arch. Path. & Lab. Med., 2:465, 1926; Am. J. Roentgenol & Rad. Therapy, 16:161, 1926.
55. Larrabee: Am. J. M. Sc., 170:384, 1925.
56. Smith: Surg., Gynec. & Obst., 40:223, 1925.
57. Murphy, Monroe, & Fitz: J. A. M. A., 88:1211, 1927.
58. Medearis and Minot: J. Clin. Investigation, 3:541, 1927.
59. Brill: J. A. M. A., 89:1215, 1927.
60. Koessler, Maurer & Loughlin: J. A. M. A., 87:476, 1927.
61. Koessler and Maurer: J. A M. A., 89:768, 1927.
62. Simmonds Becker & McCollum: J. A. M. A., 88:14, 1927.
63. Minot & Murphy: J. A. M. A., 89:759, 1927.
64. Cornell: Bull. Johns Hopkins Hosp., 40 409, 1927

CASE REPORTS AND CLINICAL SUGGESTIONS

CHRONIC PANCREATITIS WITH REPORT OF CASES.*

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SHREVEPORT, LOUISIANA.

It is not my intention to enter into an elaborate or detailed discussion of the disease named in the title of this paper. but simply to make use of the time allotted to me by reporting two cases that seem to be of more than passing interest.

The first patient was a white male, fifty-eight years of age, who was admitted to the Schumpert Memorial Sanitarium December 1, 1926, whose chief complaint was of diarrhea and a progressive loss of weight and strength.

Past History: Patient had had the usual diseases of childhood, had malaria many years ago, and an attack of nausea and vomiting nine years ago, which persisted for twenty-four hours.

Present Illness: Began eighteen months prior to admission to the hospital. The onset was gradual with an increasing number of stools daily, finally reaching as many as ten to twelve stools on some days, but the average being from four to six. These were of loose, mushy character, gray colored, and most copious in quantity. This feature was especially noticeable to the patient, and to quote his own language he wondered where it was all coming from. His appetite was excessive and he suffered no gastric disturbance except for considerable gaseous distension at times. The bowel movements were not accompanied by any griping pain or other distress. These symptoms continued with slight variations for a period of thirteen months, during which time he lost from twenty-five to thirty pounds in weight.

At this time he sought medical aid at the hands of physicians in Little Rock, Ark., and in the course of his examination a large gall stone was demonstrated by the roentgen-ray. A surgical operation was advised and the gall bladder containing a single large gall stone was removed.

He made a good recovery from the operation and for three or four weeks the diarrhea was not troublesome. After this time, however, the same symptoms returned and continued without remission up to the time he came under my observation. By this time he had lost forty-five pounds in weight.

The physical examination showed a very markedly emaciated and anemic patient. There was an artificial upper plate and the lower teeth were rather poor. The tongue was clean and rather red and glazed in appearance. The heart normal except for a faint systolic murmur over the cardiac area. The lungs showed no abnormalities. There was no apparent hepatic or splenic enlargement. There was no marked distension of the abdomen, but a very active visible peristalsis was observed through the thin and emaciated walls. A healthy scar remained from the operation. There was no general adenopathy. The reflexes were normal. The bones and joints were normal and there was no edema.

The laboratory examination showed the urine to be normal both chemically and microscopically. The blood examination gave the usual picture of a rather marked secondary anemia. An examination of the stomach contents showed no indication of stagnation. There was no free hydrochloric acid present and the total acidity was 10. The duodenal contents failed to digest proteins or fats but showed some conversion of starch. This was probably due to the presence of ptyalin in the saliva which may have been swallowed, although the stomach was washed out and the patient instructed to refrain from swallowing during the process of securing duodenal contents. Feces examination showed a copious, bulky, gray colored stool in which no parasites nor ova were found, but many fat globules and fatty acid crystals and other undigested material were present.

Full doses of dilute hydrochloric acid and pancreatic substance were given with no apparent result except that the stools were somewhat less frequent. The patient grew progressively weaker and died twenty-six days after being admitted to the hospital.

This case is reported simply as an example of the many cases of pancreatitis which result secondarily from gall bladder infections, and for the purpose of emphasizing the importance of dealing promptly and appropriately with all gall bladder infections.

The second case is one of pancreatic calculi associated with chronic interstitial pancreatitis, in which both the external and internal secretory functions were disturbed.

The patient was a colored male, age seventeen years, a farmer. He was admitted to the Shreveport Charity Hospital on October 27, 1925, with a tentative diagnosis of diabetes mellitus. His chief complaints were headaches, some disturbance of the stomach, loss of weight and strength, and excessive urinary output.

*Read before Louisiana State Medical Society, New Orleans, April 26-28, 1927.

Present Illness: Onset two years ago with frequency of urination. Recently the urination had been less frequent. During the past two months there had been considerable disturbance of the stomach such as pain, nausea and vomiting at times. His appetite was usually excessive. The bowels were inclined to be over-active.

Past History: Chicken pox, injury to spine by a fall from a wagon when a child and chills and fever three years ago. All venereal disease was denied.

Family History: His mother was living and well, father living and well. Three brothers were living and well, two sisters were living and well. None were dead.

A physical examination showed a fairly well developed negro male, age apparently eighteen to nineteen years, who was rather markedly undernourished and appeared to be quite ill. The scalp and hair were normal; the ears and nose were normal. The pupils were about equal and reacted normally to light and accommodation, the left pupil being somewhat irregular in shape. The sclerae were normal; the mucous membranes were anemic. The teeth were very poor, the gums bad and swollen and bled easily. The tongue was furrowed and very red; the pharynx congested and the tonsils large. Both clavicles were prominent with deep supra-clavicular fossae. There was apparently a depression and an absence of prominences of the spinous processes of the eleventh and twelfth dorsal vertebrae. Expansion was fairly full and equal in both lungs, and no abnormal signs were elicited on percussion or auscultation. The heart was apparently normal in size and position; there were no murmurs. There was slight general abdominal tenderness but no hepatic nor splenic enlargement, and the kidneys were not palpable. No tumors nor masses were felt. The extremities were emaciated, with abrasions on the elbows and knees. Sensation was about normal; no adenopathy.

Laboratory Examinations: Red cell count 3,230,000, white cell count 7,750. Hemoglobin 50. Differential count: Polys 52 per cent; large lymphocytes 12 per cent; small lymphocytes 36 per cent. The Wassermann was negative. The urine showed nothing abnormal except the presence of sugar. A blood sugar on the first examination was very high, being 508 mgms. per 100 cc. of blood. The gastric analysis showed free hydrochloric acid 25, total acidity 47. Radiographic examination of the spine showed an apparent rarefaction and narrowing of the twelfth dorsal vertebra. Radiograph of the sinuses shows an opacity of the antrum and posterior ethmoids on the right side.

The patient was placed on a maintenance diet without insulin. The urine continued to show sugar daily, with some reduction of blood sugar. He was then given insulin, beginning with small doses and gradually increasing until the urine was sugar free. This required fifteen units twice daily, which were given before breakfast and before supper.

An interesting feature of the case was that with the urine sugar free, the blood sugar remained quite high, sometimes 200 or more mgms. per 100 cc. The patient made no improvement, making no gain in weight or strength and appearing quite prostrated. His diet was increased and the insulin dosage increased with no result except an increase of the diarrhea. The stools were soft and large in quantity, gray in color and contained fats and other undigested material. Specimens of duodenal contents were secured by the duodenal tube, the examination of which showed none of the pancreatic ferments present.

The conclusion was then reached that the condition was a total pancreatitis in which both internal and external secreting functions were involved. The patient continued a downward course and died from inanition after being in the hospital seventy-five days.

The autopsy showed the following: The body was that of an extremely emaciated male adult. It measured 64 cm. in length. There were a few small decubitus ulcers on the dorsal bony prominences. The pupils were dilated and equal. There was some edema of the face, especially of the eyelids. On opening the peritoneal cavity, the stomach was found to be somewhat dilated. The intestines were apparently normal, but the mesenteric lymph nodes were enlarged. The foramen of Winslow was patent. The diaphragm reached to normal limits on each side. The left pleural cavity was free of adhesions except for one fibrous band at the base of the lung. The left cavity contained about 30 cc. of straw colored fluid. The right pleural cavity was free of adhesions and contained about 30 cc. of straw colored fluid. The pericardial cavity was apparently normal. The heart was slightly smaller than normal, and many milk colored patches were present on the auricles and ventricles. The left auricular appendage was vermiform. There was no sclerosis of the coronaries. The heart muscle was pale and friable. There was slight thickening of the cusps of the aortic valve; the other valves appearing normal. Both lungs were very edematous, but no other pathology was found. The stomach was dilated, and petechial hemorrhages were present under the mucosa. The pancreas was extremely small, and no normal tissue could be made out. It seemed to be composed entirely of fibrous tissue, and there were many calcareous masses throughout. These calcareous masses could be enucleated very easily, giving the impression that they were deposited in the ducts

or acini. The liver was small, and showed extreme congestion. The gall bladder was atrophic. The spleen was normal in size, but did not scrape on section.

The kidneys were extremely congested, and the markings were indistinct. The capsules stripped easily. The urinary bladder was distended, but otherwise negative. The prostate was not enlarged. Pathologists' report on examination of pancreas was to the effect that the glandular structure was practically destroyed and replaced almost entirely by fibrous tissue.

The small shotlike masses proved to be calculi composed principally of calcium carbonate.

DISCUSSION.

Dr. Allen Eustis (New Orleans): The question of pancreatitis is one that is coming more into the literature in the past few years, and on account of its close association with other diseases, disease of the gall bladder especially, it is often overlooked.

I wish to recall again the two most prominent symptoms which Dr. Knighton has brought out; that is, progressive loss of weight and diarrhea. Our patients will complain of diarrhea but as a matter of fact these stools are not watery stools; they are soft mushy stools, usually light in color and always fatty due to the absence of the fat splitting ferment.

You will realize the difference in the amount of fecal matter obtained from an individual with total pancreatitis and a normal individual when I tell you that the stools of a normal individual on a Smith diet will weigh when dried fifty-one grams; while the stools of an indivdual with total pancreatitis on the same diet will weight 351 grams, showing that the individual without pancreatic function passes seven times as much fecal matter as the normal individual, and that is quite a common complaint. They don't know where it is all coming from.

There is one other symptom of pancreatitis which I called attention to in the past and that is a stomatitis, often going to the ulcerative stage but quite often simply the redness that you find on the tongue. I would like to ask Dr. Knighton whether either of these patients presented this symptom because I find it quite common.

Another condition that we must consider in connection with pancreatitis, as Dr. Knighton has brought out, is the secretion of the stomach. If it is not active you naturally have less digestion and more progressive loss of weight and larger stools than in the individual who has normal gastric secretion, because the gastric secretion can carry on a certain amount of digestion.

An important point to be remembered in connection with pancreatitis is the cause of pancreatitis. In the past six months (it happened that both came at once) I have had two cases of carcinoma of the head of the pancreas within two months of one another. The diagnosis I am glad to say was made prior to operation. In taking the history, they both presented jaundice with diarrhea. Whenever I have a patient tell me he has diarrhea, I ask what is the type. These were not watery. In examining the patients further, it was a definite pancreatic insufficiency. The jaundice in one patient had only been present for three weeks, although he had quite a distinct jaundice, in fact, decidedly green. The other patient had had the jaundice persisting for eight months without operative surgery. How it persisted I don't know, but at operation both of them presented carcinoma of the head of the pancreas. So in obstructive jaundice think of the pancreas as a possible cause of your obstruction.

Another point I would like to call your attention to, is that syphilis can cause interstitial changes in the pancreas just as we find these changes in the liver and in the spleen, and in my series I have two cases in which syphilis was the only etiological factor we could find and which improved and are well today on antisyphilitic treatment.

What the pathology was in those cases I don't know, or how extensive it was, but I mention that as a point to remember; that these pancreatitis cases may be due to syphilis.

However, we know as a matter of fact that gall bladder infection is the cause of the condition in a vast majority of cases, and I am glad to hear Dr. Knighten impress upon you again that the danger in neglecting gall bladder infection is with the pancreas.

In a paper that I read some few years ago I reported several cases of diabetes that had developed under my observation during the past fifteen years, the primary lesion being in the gall bladder and they refusing operative procedure. One case that was operated on, a case of definite diabetes, today is on a maintenanc diet without insulin. The gall bladder was removed.

In these cases there may not be any gross changes in the entire pancreas but sufficient inflammatory changes in the pancreas to produce disturbance in the internal secretion. These cases are potential diabetics but they are surgical cases and not medical cases.

Referring to the medical treatment of pancreatic cases, they are, of course, as a rule very unsatisfactory, but I believe in many instances it is due probably to the lack of conception of the function of the pancreas and the ability of the

pancreas to digest. First of all, let us realize that these ferments are proteins and they are digested and destroyed by the gastric secretions so that if your patient has a normal gastric secretion your pancreatic extract given in powder form or in a soluble capsule is of no more value than if you put it on the skin. In order to obtain any effect from extract of pancreas given to an individual with normal gastric secretion it must be given in a capsule which is not going to be digested in the stomach.

As a rule I do not mention proprietary medicines but Fairchild has on the market a very good extract of pancreas under the trade name of holladin which is marketed in keratin capsules. I have had marked effect from the administration of these capsules but not according to the directions advised by the manufacturers because they advise one to three capsules after each meal. That is ridiculous. If you expect any effect on a whole meal you must use at least six to eight and if you do give that in the vast majority of cases you will find a reduction in the amount of stools and a gain in weight.

However, we must realize that it is a progressive disease and we can't change the interstitial fibrous tissue into a normal glandular tissue, but in the subacute cases and in transient cases secondary to gall bladder disease we can prevent progress of the disease by surgical measures.

Dr. A. A. Herold (Shreveport): I am very much interested in Dr. Knighton's paper, especially as Dr. Eustis emphasized the prophylaxis of it by taking out the gall bladder. I wish to add one more case report to the two which Dr. Knighton reported. I had a patient admitted to the Shreveport Sanitarium about five years ago with a history of repeated attacks of jaundice. He was a large man, stout, and a big eater and rather free drinker. He was seized the day before admission with acute abdominal pain accompanied by diarrhea and vomiting. When we saw him at the sanatarium he was in collapse. I am not sure whether Dr. Knighton saw him or not but his associate, Dr. Willis, was in consultation on the case.

We decided to try to tide him over and we did tide him over to the next day when he died. Autopsy showed a large thickened gall bladder, grumous bile and a marked pericholecystitis, no stones, an acute hemorrhagic pancreas, large swollen and the blood vessels congested, fatty necrosis in the abdominal wall and thrombosis of the mesentery vessels. He had enough things to account for his death.

Referring to Dr. Eustis' remark about the Fairchild preparation, I have under observation for several years a case of diabetes which formerly had acute attacks of abdominal pain with fever and diarrhea, fatty diarrhea. I presume they were acute attacks of pancreatitis associated with the diabetes, and by the administration of this holladin without the coated capsules, I thought I got improvement in his condition. I certainly shortened the duration of these attacks of pancreatitis. But the main thing brought out in the paper is prophylaxis of this condition rather than curing it and prophylaxis is certainly attention to the gall bladder.

Dr. J. B. Guthrie (New Orleans): I am very much interested in Dr. Knighton's report. I was struck with what seemed to me inadequate dose of insulin, if you will permit me. Dr. Eustis suggests an addition in the matter of the external secretion of the pancreas, and let me suggest if we had the case to review and go over again, to give the patient any hope we would have to give a larger dose of insulin than this man received. We are dealing here with a total absence of pancreatic function. The treatment evidently failed to supply the digestive ferments to this man's bowel. The treatment would have continued to fail had he not received a larger dose of insulin than the doctor reported.

If I understood him right, it was fifteen units twice a day, which brought the blood sugar down from the neighborhood of 500 to the neighborhood of 230 and there the doctor was content to rest with his insulin because the man was sugar free.

Now I feel that I am not doing my duty, having worked with insulin considerably, not to raise my voice once more to insist that where possible the urinary sugar be disregarded as the guide for the administration of insulin. In consultation work I encounter daily cases where the doctor has the case sugar free and he is content with the blood sugar at 238, over 200. The majority of these cases that we see, I feel safe in saying, have a high threshold of sugar and are therefore diabetic, notwithstanding that the urine is absolutely sugar free during the twenty-four hours the specimen is taken. I am asking only therefore, that you make the blood sugar the guide and aim to get the patient to at least supply his insular deficiency at a rate commensurate to render his blood sugar something near normal.

We see these cases constantly with a high blood sugar and they are going on, progressive changes in the arteries, in the organs, they are down, down, down with diabetes. I feel that we should get the blood sugar somewhere near normal, and keep it so if it is humanly possible.

Last year I was able to report a scheme or rule of thumb, if you please, for the administration of insulin. Applied to Dr. Knighton's case, I would say that this man needed sixty units more of insulin daily than he was getting. We know that unless we correct the diabetic condition supplementing the insulin deficiency (this man was a diabetic incidental to the disease of the pancreas) we have a very poor chance of doing anything at all for the patient. If the patient needs surgery, if the patient needs medication along other lines, first of all we have got to get him in better condition so far as diabetes is concerned.

The rule that I alluded to was the administration of two and one-half units of insulin per day for every ten milligrams of blood sugar in excess of ninety. In other words, subtract ninety from Dr. Knighton's figures, 238, and divide by four and it gives you the additional dosage of insulin units needed. Then the next subsequent blood sugar observation enables you to make another correction. Divide by four and add it to the dose already taken. This is a pretty safe and conservative figure to govern the control of the dose.

I have tried it on a large series of cases and have occasional reactions, of course. Every one who works with insulin at all gets reactions; but nothing that is serious. Sometimes reactions in ambulant cases have created a certain amount of alarm but we never had any deaths from following out this rule and it errs along the safety side if there is an error.

Dr. Knighton (closing): Regarding Dr. Guthrie's suggestion that larger doses of insulin should have been given, I would state that he probably overlooked the statement in the paper that insulin was increased. However, in this case, it matters not how much insulin may have been given, the ultimate result would have been the same; for there was a total destruction of the glandular structure of the pancreas.

In answer to Dr. Eustis' question as to whether stomatitis was present in these cases, I would state that the elderly patient, had a rather red glazed tongue, very much like the condition seen in pernicious anemia but not a definite stomatitis.

To go back to the patient that had such an enormously high blood sugar, the autopsy findings were quite interesting, particularly with reference to the pancreas. On first appearance, I was sure the pancreas was the victim of tubercular infection. It had those ricelike bodies scattered all through it, observed from the surface, but it was not tuberculosis as was determined later. It was simply a deposit throughout the structure of the pancreas of these phosphatic calculi.

As has been emphasized by one of those who have spoken, the chief thing of importance in a discussion of this kind is the question of prophylaxis. I think most of us would be surprised if we should make observations of the function of the pancreas following all attacks of gall stones, if we would make it a routine carefully to get the duodenal contents during the few days following gall stone attacks, we would be surprised in the great number of cases that would show complete absence or suspension of the function of the pancreas.

Of course, that is the external secretions, but if we have an infection or an irritation sufficient to suspend the digestive functions, the external secretion, we may just as easily get the internal secretion interfered with also.

I thank you, gentlemen, for your discussion.

REMOVAL OF BULLET FROM WALLS OF HEART AND REPORT OF STAB WOUND OF HEART.*

CARROLL W. ALLEN, M. D.,

NEW ORLEANS.

The thoracic cavity occupies much the same position today in the field of surgery as did the abdominal cavity thirty years ago when a few comparatively simple operations were being performed routinely by the pioneers in surgery, foreshadowing the tremendous development of the present time. While the thoracic cavity does not now appear to offer such an extensive field, medical opinion held the same view regarding the abdominal cavity three or four decades ago.

My earliest recollections of intra-thoracic surgery were of such cases as were operated upon by the use of the Fell-O'Dwyer apparatus for artificial respiration, which internes of my time at the Charity Hospital were quite familiar with, when we relieved each other in hourly shifts in keeping up respiration in cases of opium narcosis. This machine paved the way for intratracheal anesthesia which has since given way to much simpler apparatus.

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*Read before the Mississippi State Medical Association, Jackson, May 10-12, 1927.

Another recollection which I have of the beginning of intra-thoracic surgery was the first use of the Sauerbruck cabinet in this country as demonstrated by Dr. Sauerbruck himself.

My own earliest activities in this field were in animal experimentation in operations on the vascular system which occupied a large part of my time daily for a period of four years, during which time I made notes of considerably over 1,000 operations, a large number being intrathoracic procedures.

One of my pleasantest recollections of this experience was the association with me in this work of Drs. F. R. Gomila, H. W. E. Walther, Ansel M. Caine and M. P. Boebinger, through whose untiring, constant and zealous efforts must be attributed many of the successes accomplished. This work carried on in the laboratory of Tulane University developed an accurate, dependable and simple technic which has been of much value since. All of this intrathoracic work was done by the intratracheal method.

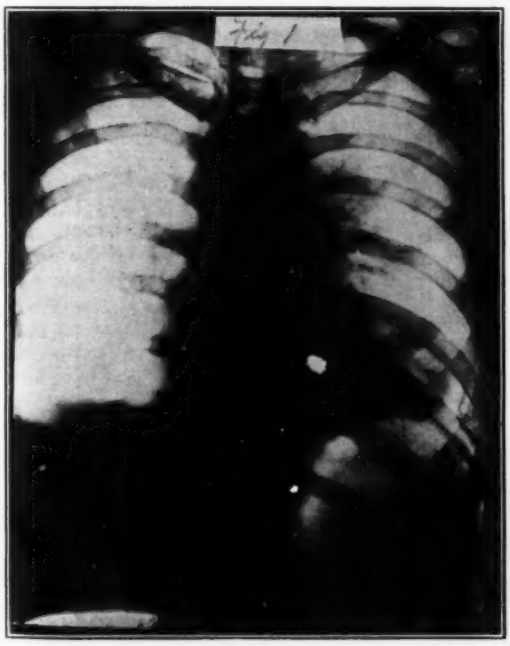

Fig. 1. Bullet in heart

The following case presents points of sufficient interest to justify presentation on this occasion, for which opportunity I must thank my friend Dr. M. L. Flynt.

CASE REPORT.

Mr. R. C. H., aged 24 years, of New Hebron, Miss., was shot at close range by a pistol on December 5, 1926. The bullet fractured the 8th rib in the mid-axillary line and entered the thorax.

Admitted at once to Pineview General Hospital, D'Lo, Miss., the patient showed some shock, but was otherwise in fair condition. The fluoroscopic and roentgen-ray examinations made by Dr. G. C. Russell showed the bullet to occupy a position about the middle of the heart and to move with each heart beat, making an excursion of about an inch from right to left in a wobbly manner. This picture produced quite a thrill for all who saw it. Here was a man in apparently fair condition with a bullet plainly seen within the heart and the heart functioning normally. (Fig. 1.)

Dr. Flynt got me on the phone. I advised its removal and went out immediately. On my arrival an examination showed a robust young man in good physical condition, except that he presented some evidence of shock. The examination of the thorax showed slight dullness in the posterior portion. The bullet wound was located in the mid-axillary line, the 8th rib being fractured at this point. Ausculation of the heart showed its action to be normal and regular, but with a peculiar, sharp, metallic tinkling sound which appeared to be most intense just after the closure of the mitral valves, and lasting with diminishing intensity through the heart cycle.

The patient was then placed under the fluoroscope and the bullet again plainly seen about the middle of the heart and moving to and fro with each excursion. The patient's position was changed to determine the lateral plane in which the bullet lay. It was seen that in rotating the patient slightly to the left the bullet traveled to the right. This observation indicated that the bullet was in the posterior part of the heart.

It was realized that a dependable anesthesia was a most important feature, as any struggling or violent effort on the part of the patient might prove decidedly dangerous. Dr. R. E. Giles of Mendenhall assumed this responsibility and with the gas and oxygen method carried the patient along with a smooth, even anesthesia, without any apparent muscular contraction.

Assisting at the operation were Drs. M. L. Flynt, D'Lo; D. T. Langston, New Hebron, and E. S. Waller, Silver Creek.

A large trap-door flop was quickly raised and reflected laterally. As the thorax was entered the

lung immediately collapsed, the disturbance being apparent in respiration and pulse. A large double towel wet in warm saline was quickly spread over the chest wall and draped down into the thorax, packing it snugly against the chest wall to the side, and behind and above the heart in the mid-line. An ordinary nozzle of a suction apparatus previously placed in the upper part of the cavity occupied by the lung quickly exhausted the air and brought the lung down in contact with the towel which was immediately evident by a quieting down of pulse and respiration. The suction was kept operating throughout the operation.

The heart was now in plain view and freely accessible through the large opening. About one-half pint of clotted blood was removed from the thorax.

The bullet or its point of entrance through the pericardium was not readily found, and each in turn had an opportunity to hold the heart within his hand and palpate its surface.

The heart muscle felt much firmer than the ordinary skeletal muscle, feeling more like the deltoid in a moderate state of contraction, and when held within the hand felt much like a large bull frog, or other animal struggling to get away. Unless held too firmly this did not seem to affect its contractions, and there was very little noticeable effect on the pulse.

The bullet was finally located on the posterior surface about one inch from the lower border of the heart, embedded within the pericardium which it had entered obliquely, penetrating the heart muscle for what appeared to be about one-fourth inch and pinning the pericadium to the heart at this point. The bullet, which proved to be about a 38 calibre, was lying with its external surface about level with the pericardium embedded in a fibrinous exudate which accounts for its having been overlooked when the surface was first hastily examined.

Once located, the bullet was easily removed with the fingers and seemed to have gone about halfway through the pericardium slightly indenting the heart wall just sufficiently to fix the pericardium at this point. There was no bleeding or disturbance following its removal, and the pericardium did not appear to contain any blood.

Having satisfied ourselves that no suturing for the control of hemorrhage would be needed, the towel packing off the thoracic cavity above was removed and the flap returned to its position and quickly sutured in place. The suction tube was allowed to remain in the cavity during these final steps and only removed when the last suture was inserted and after determining by percussion that the lung was against the chest wall.

The patient left the table in good condition and made an uneventful recovery.

The following are notes taken from the hospital record:

"Patient reacted nicely after operation and rested splendidly during afternoon and night following. Next morning coughed almost continuously, spitting up bloody sputum. Third day feeling very well. Fourth day cough subsiding. Eighth and ninth days up in rolling chair. Appetite good. Discharged on tenth day in good condition, wound almost completely healed. Some dullness over lower portion of left lung." (Figs. 2 and 3.)

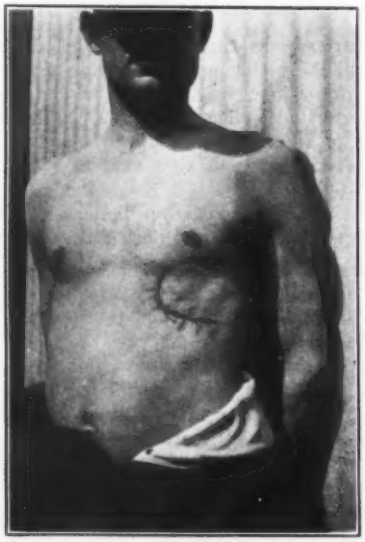

Fig. 2. After recovery

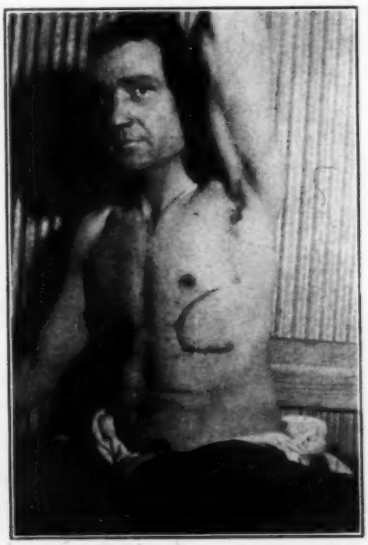

Fig. 3. Showing complete range of motion of arm

Fig. 4. Illustrating trap door flap on cadaver

Reports from the patient since indicate that he has had no further trouble and has regained his former good health.

Technic of Trap Door Flap. After many different methods and variations I have adopted the following as the simplest, quickest and most satisfactory method for entering the thorax, whether in front or behind. The opening should be made sufficiently large to allow ample room for satisfactory manipulation within as it cannot be enlarged later without impairing a satisfactory closure. The opening will always be the smallest part of the field. Once within the thorax the retraction of the lung affords ample space, just the opposite of what we meet in the abdomen where the viscera crowd into the field and have to be packed off and retracted away. Unless special reasons contra-indicate, the flaps should always be turned from the distal toward the proximal end of the ribs. Flaps should always include three ribs if the hand is to enter the cavity freely and four ribs if much room is needed for manipulation. (Figs. 4 and 5.)

The length of the flap from its tip to its base should be at least six inches. The incision should be horseshoe shaped with its concavity outward, the parallel arms in the middle of the respective intercostal spaces and first carried down to the intercostal muscles all along. Hemostasis should be completed and all vessels tied before going further.

The ribs at the base of the flap should now be divided. They should first be exposed by a short incision in their long axis and a costeotome passed around them from above and made to bite through the ribs almost its complete width. If the bite of the costeotome includes any of the tissues below the rib it may include the intercostal artery which is capable of producing a troublesome hemorrhage and cause unnecessary delay in securing it. If the bite does not include the full width of the rib, it will fracture easily with slight traction. Each rib is treated in a similar way. The ribs at the distal end of the flap are now cut through, the intervening intercostal muscles divided, and the incision carried along the middle of the intercostal spaces to the proximal end of the flap.

The flap is now reflected outward and the lung space packed off with a towel. Further hemostasis is completed and any spicules of bone which may be projecting inward are trimmed off.

I regard the use of the suction apparatus and towel to pack off the lung as described above a valuable aid in keeping the lung distended when suitable mouthpieces for this purpose are not at hand and may prove useful in other procedures.

In closing these wounds, I prefer figures of eight sutures through the intercostal muscles all around, with the usual deep sutures for the skin and subcutaneous tissues. Before closing the last stitch, we should be sure that the lung is against the chest wall. The wound closed in this way will not leak and usually heals firmly.

Fig. 5. Showing degree of exposure of heart and lungs

SUTURE OF STAB WOUND OF THE HEART.

I would like to add to the above the report of a case of stab wound of the heart operated by the same method.

P., age 32 years, was stabbed on April 13, between the 5th and 6th ribs on the left side, the knife entering about two inches from the sternum and passing upward and inward. The patient collapsed and was rushed to town, a distance of about ten miles, and admitted to the Southern Baptist Hospital. He was received and given first aid by Dr. J. O. Lisenby and other members of the staff and admitted to the service of Dr. T. B. Sellers, who immediately invited me to operate and to whom I am indebted for the opportunity of making this report.

On arrival at the hospital the patient showed extreme shock and appeared as if dead several times but responded each time to adrenalin administered by Dr. Lisenby.

During the short delay necessary in getting him on the operating table it was found that the lung space on each side was normal and the area of dullness occupied by the heart and pericardium much enlarged. A hasty roentgen-ray examination made during this interval shows this condition very clearly. (Fig. 6.) The operation was hastily performed with Dr. A. M. Caine anesthetizing. The technic described in the preceding case was followed in detail. When the pre-pericardial tissues were reached much blood was encountered and seen to come from a rent in the anterior surface of the pericardium. This was quickly enlarged and the cavity evacuated of its contents which exposed an incised opening in the right ventricle from which blood spurted at each heart beat. The edges of this opening were quickly but gently secured and closed by a series of interrupted sutures reinforced by several superimposed sutures. After evacuating all blood the pericardium was closed with a soft rubber tissue drain in its lower portion. The intercostal flap returned to its position with a similar drain in the lower portion of the pleural sac.

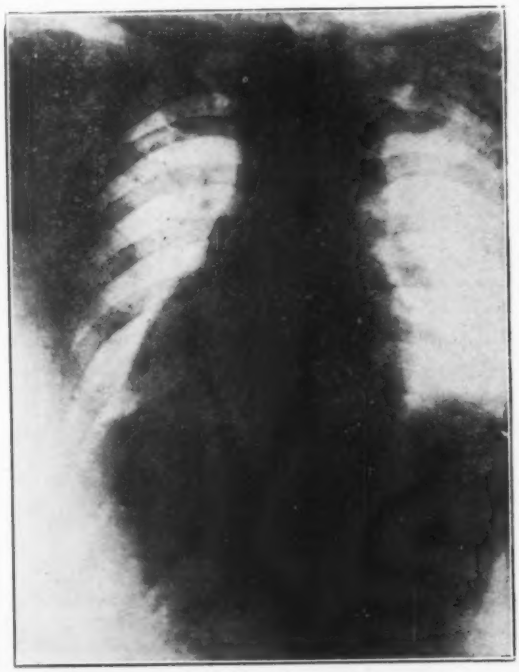

Fig. 6. Showing pericardium dilated with blood

Post-operative notes: Patient rallied considerably with circulation and general condition good during that afternoon and early part of night. Opiates were administered freely.

During early part of the morning he became quite restless with failure in the circulation which did not respond to stimulants. Death occurred about 1 P. M.

Dr. P. G. Cully, resident physician of the Baptist Hospital, was present at the post-mortem performed by Dr. Geo. F. Roeling, coroner, at which the heart was removed and examined in detail. It was found that the suture line was intact and that no leak had occurred following the operation. The left lung was partially collapsed. This may have been due to injury to the lung tissue which was not detected at time of operation or a possible leak around the rubber tissue drain left in the cavity as I am quite sure the lung was against the chest wall at the time of suturing the flap back into place.

Comment: I am somewhat doubtful regarding shock being entirely responsible for death in this case. The patient left the table in fair condition and remained so during most of the following night. The pulse ranged from 120 to 140, the respiration from 10 to 16. Immediately following operation he did not seem to need stimulation or transfusion and both were withheld as I had learned from experience with dogs following operations on the heart or large vessels that the chances of success were greatly increased by keeping the circulation depressed, as a vigorously acting heart or high tension in the large vascular trunks often caused the suture line to give way, while a depressed circulation kept within the limits of safety was much to be desired.

The possibility that the suture line which crossed the ventricle for about one inch may have interfered with innervation must be considered, as well as the possibility of some central thrombosis which was not detected at post-mortem.

The late effect of the hemorrhage must be considered as possible cause, as we frequently see

cases who have suffered severe hemorrhage die several hours after the arrest of all bleeding.

That some embarrassment occurred from the partial collapse of the left lung must be taken into account, but this does not appear to me to be likely as the respiration was at no time over 16, but this could have been influenced by opiates.

Shock plus any of the above causes would seem the most likely explanation of his death.

DISCUSSION.

(Dr. M. L. Flynt read discussion.)

Dr. C. C. Hightower (Hattiesburg): I want to compliment Dr. Allen upon this case and Dr. Flynt for his management of it and for having enough judgment to call Dr. Allen. I should have done likewise had I a case like this. I have had no experience with surgery of the heart, but I am mighty glad to have heard this case reported and especially to hear the technic described, because all of us may be called upon at any time to operate upon the heart and may not have the opportunity that Dr. Flynt had to call Dr. Allen. Minutes may mean life in some cases. The only practical experience I have had was observations I made, and my conclusion was not that the heart can not be operated on but that very often the patient has an opportunity to bleed to death before you have a chance to operate. I was making experiments on dogs while in school to study cerebral localization. I had the dog thoroughly anesthetized and removed a flap of bone from one side of the skull and was using an electric needle to study cerebral localization. After working for a while it became necessary to kill the dog, and as he was thoroughly anesthetized and I wanted to observe the heart I turned down a flap over the dog's heart and thoroughly exposed it. I made a bigger opening than Dr. Allen did. I took the heart in my hand and held it and had the same sensation Dr. Allen had, of hard, firm muscle. I held the heart in my hand for some time, and examined it thoroughly. It was still necessary to kill the dog, so I made up my mind to see how much pressure it would take on the heart to kill the dog. I held it in my hand—took both hands—and as I remember it took three or four or five minutes of firm pressure before the dog died. That experiment convinced me that the heart will stand a great deal of punishment. It is not the injury to the heart itself but the bleeding that offers the most danger in these cases.

Bear in mind that the dog was thoroughly anesthetized and suffered no pain, as that sounds like a very brutal proceeding.

Dr. A. Street (Vicksburg): I wish to narrate briefly one case. While in France at Base Hospital No. 15, Dr. Phillips asked me one day if I wanted to come over and help take a bullet out of the liver. We exposed the track of the bullet and over the fluoroscope we easily put a clamp down to the bullet. Dr. Phillips attempted to pull the bullet out, and it would not come. The reason why it would not come was that it was in one of the large hepatic veins. The bullet slipped out from in between his clamp blades and disappeared. We looked for it and saw it jiggling around in the heart region. It had evidently followed the course of the vein into the heart. We did not do anything more right then but sent the patient back to bed. While the procedure was being considered and we were wondering what we were going to do about that bullet inside the heart, he became suddenly ill; and it developed that the bullet had passed on out of the heart into the pulmonary artery and caused a large embolism. Nothing was done immediately; and the patient withstood the large machine-gun bullet embolism. About a week from that time, while recovering from this embolic process, he developed diphtheria and died.

Dr. M. L. Flynt (D'Lo, Miss.): There is not much I can say in discussing Dr. Allen's paper, as this is the first experience I have had with a heart injury. But I must say it was a very interesting case, indeed. The diagnosis was comparatively easy to make. Here was a stout, robust man, who entered the hospital about 2 o'clock A. M. with a pistol ball wound of the left chest in the mid-axillary line. He was pale and had an anxious expression on his face. He was very much nauseated and vomited a large amount of dark fluid immediately after being put to bed. He was also coughing and expectorating some blood. His radial pulse was 80, very good volume. In listening over his chest, moist rales could be heard all over the upper left lung, and a loud metallic sound could be heard with each second sound of the heart, which led us to suspect that the bullet had probably injured that organ, and under fluoroscopic examination it was plainly seen to be imbedded in the heart structure, as it would move up and down with each pulsation of the heart.

Now, what should be done for the patient was the next question to be solved. Could a man survive an operation for removal of a bullet from his heart, and would he get well by leaving it? After consulting with Drs. Langston and Waller, his family physicians, we decided to call Dr. Allen and get his advice. He immediately advised operation, after we had explained the case to him over the telephone.

The patient was advised of his condition and the necessity of operating and removing the bullet. He was anxious to have it done and felt that he would go through with it all right, which

was a lot in his favor. We kept him very quiet on morphin until Dr. Allen could arrive, which was also a good thing to do as pre-operative treatment.

Wounds of the heart rarely come to the surgeon for treatment because in most cases the patient survives but a few minutes after the infliction of the injury, therefore, it is difficult to estimate their comparative frequency. It is said that the ventricles are more frequently wounded than the auricles, and because of the thickness of their walls, may undergo quite a severe laceration. Or a bullet may even enter the heart and come to rest in the ventricle itself without immediate death, and, indeed, such bullets have been removed at operation with recovery of the patient, as we have had the opportunity to present a case to you today.

Such injuries inflicted in the auricles nearly always involve the chamber because of the thinness of the walls. These, of course, cause immediate death. Wounds of the heart are dangerous in proportion to the size of the injury done and, also, to the location affected. A needle puncture of the walls of the coronary artery near its origin, or through the inter-auricular septum at the bundle of His quickly causes death. Other danger zones are the auricular-ventricular wall where the injuries may be lethal. Also, a wound at the right auricular base near the entrance of the veins is quickly fatal. The walls of the ventricles seem to bear wounding much better, and Elsberg has gone so far as to resect experimentally the apex of the heart with success. The valves of the heart will bear wounding and have been torn without death, but the endocardum is very sensitive to operative procedures.

The knowledge that there may be spontaneous recovery from a cardiac injury should not deter the surgeon from operating in nearly every case in which a recent cardiac wound has been diagnosed, because sometimes a comparativly small hemorrhage will cause distention of the pericardial sac, compress the heart and cause it to stop pulsating. Again, a foreign body may be retained in the heart muscle for a time without many symptoms, and later cause a thrombosis in the heart cavity, and death.

The greatest danger in the cardiac injury cases which reach the surgeon is infection, and by refraining from operation the patient is put in peril of this complicatioon, and Lilienthal says, "All things considered, it is safe to make it a rule that operation should be performed in every case in which there has been recovery from initial shock."

I want to commend Dr. Allen on his operation in this case. It was done quickly and with precision. I was impressed with the incision made, there being ample room to pass the hand into the chest, the trap door flap which made an easy and firm closure. I was also impressed with the use of the wet pack and suction apparatus, this being carried out during the entire operative procedure.

Dr. Allen (closing): I want to thank you all very much. I have nothing more to say, because there is nothing else to bring out. There will be some technical details in my publication, but this thing simply illustrates one point—the value of preparedness. I prepared myself over twenty-five years ago to do this operation. That was my first heart surgery. I have done a great deal of intrathoracic work and some on the large vessels, but this was my first heart case.

A LAYMAN LOOKS AT HOSPITAL COST.

In the papers at this writing is a picture of the proposed plan of the New York Hospital and Cornell Medical College. It is a handsome picture and should be, for the building, over by the East River, is to cost eleven million dollars. Another vast hospital aggregation, as will be recalled, has been erected uptown at 168th Street. It is very, very big and was very expensive. . . . This is a period of construction. It was never so dear as now and there was never so much of it. If this matter of hospital construction was going to settle anything, if we were putting up hospitals enough for everybody, which would continue to handle the job for a generation or two, that would be one thing, but more likely they will be swamped in four or five years by increase of patients. Hospital building seems to be as steady and continuous an expenditure as that of cemeteries. Here is a matter about which it would be nice to be instructed where we get off. How much is life worth in dollars and can we afford the present rates? In so far as spirit can be made to cure the body and save us hospital expenses, by all means let us get it done. The present idea is that hospital charges shall be related to the income of the patient, that the poor shall pay very little and the rich a great deal. That is done and sometimes overdone and usually works pretty well, but for the people who are neither rich nor poor but are used to pay for what they get, a considerable illness alleviated by contemporary skill with all the modern improvements may be a crushing financial calamity. The suggestion that what rich people pay for hospital experiences shall be deducted from their income tax as money spent for charity has really a good deal to recommend it.—E. S. Martin, Life, Nov. 17, 1927, p. 20.

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THE DISTRIBUTION OF PHYSICIANS IN LOUISIANA AND MISSISSIPPI.

A question that has been agitating certain prominent members of the medical profession the past few years has been the presumed lack of medical service in rural communities. This hypothetical deficiency in medical care in rural communities as a result of the failure of recent graduates of medical schools to settle in such sections of the country has been made the basis of an attack upon the present high standards of medical education. In other words, it is believed that by curtailing the length of the curriculum it will be possible to send incompletely trained men into the rural districts, because they would be content to work there at a smaller remuneration than the men who are taking the full present day medical course with the attendant expenses of time, labor and money. That such an argument is fallacious is shown by the fact that practically all of the poorly and shortly trained cultists migrate at once to the larger centers of population when they have completed the few months necessary to take the courses in their particular cult.

The lack of physicians in the rural communities in New Hampshire, Vermont, and Maine seems to be particularly acute, although this condition exists throughout other States in the Union according to Dr. Pusey. He shows from his statistics that only 9 per cent of 4,410 physicians in 283 rural communities in 41 states were graduates of the last 10 years. These figures apparently indicate that in some sections of the country at least practice in rural communities is looked down upon by the recent graduates. The Southern States apparently have not been fully investigated. It is for this reason that we have made a study of the location of physicians in Louisiana and Mississippi who have graduated in the period from 1915 up to the present date as given by the Medical Directory of the American Medical Association. The figures given below represent practically a 10 year period, as the graduates of 1926 and 1927 are undergoing or have just finished their interneship and have not had the opportunity of being placed in the directory. In Louisiana 36 and in Mississippi 55 graduates in this period have settled in communities with a population of under 250. In communities between 500 and 1,000 population, 19 in Louisiana and 21 in Mississippi; 1,000 to 2,000, 17 and 27 respectively; 2,000 to 5,000, 32 and 33 respectively; 5,000 to 10,000, 10 and 23; 10,000 to 15,000, 23 and 30; 15,000 to 20,000, 11 and 19. The total in cities of over 20,000, 375 from Louisiana and 35 from Mississippi. During this 10 year period, 423 graduates of medicine have settled in Louisiana and 243 in Mississippi.

In Louisiana 40 per cent of the graduates have settled in communities under 20,000. In Mississippi the largest percentage of men have gone to the smaller towns and rural communities. Incidentally, in Mississippi about one-fifth of the physicians settling in that State have moved to localities where there are under 500 population.

The figures for Tulane Medical School, which has supplied about 30 per cent of the physicians in Mississippi in recent years and about 40 per cent in Louisiana, differ somewhat from those given above. In the State of Mississippi most of the graduates have settled in communities fairly well populated. This, however, does not hold true in Louisiana, where we find 27 of 157 graduates in the past 10 years settling in communities of under 1,000 population.

It will be seen from these statistics that in this section of the South there is not the possible acute need of doctors in the rural communities which may prevail in other regions. It has been said that development of good roads, automobiles and rapid transportation facilities has resulted in making one doctor take the place of three. This is probably the solution of the difficulty, a difficulty which is unduly magnified in the North, and which does not exist in the far South.

MALARIA IN MISSISSIPPI.

Elsewhere in this issue will be found an article on malaria that is indeed worthy of the thought of every physician in the state of Mississippi. Lippincott calls your attention to the fact that in seven years a total of 776,558 cases of malaria were reported by the physicians of this state. That would mean that each year 10 per cent of the people of Mississippi had some disease that was diagnosed by the physicians of this state as malaria. It would be equally interesting, if it were possible, for the State Board of Health to tell just how many of these diagnoses were based on blood examinations. A very significant fact is that from the same county that in this period reported 13,803 instances of malaria, parasites were found in blood smears only 177 times.

In the light of such figures it is only natural to ask how many physicians are in the habit of making note of the number of cases of malaria they see from day to day. It is possible that these high figures are due to the fact that, when the County Health Officer sends his card around each month to be filled in, the busy doctor scratches his head a moment and *guesses* that he has seen such and such a number of cases of malaria. How many of these cases of "malaria" are really tuberculosis, or pyosalpinx, or liver abscess, or pyelitis, or any other of a dozen diseases that cause chills and fever and which will naturally run on until such a time as they will be definitely diagnosed and treated?

AGAIN THE CHIROPRACTORS.

At the next meeting of the Louisiana Legislature a bill will be introduced by those backing the efforts of the chiropractors to enter the State. This fact should be noted by every medical man in the State, and efforts to defeat this bill should be begun at once by personal interviews with the prospective candidates of the House and Senate demanding their views and beliefs as to the validity of such a bill with the idea of supporting those candidates intelligent enough to see the fallacy of the chiropractic arguments. This is a duty which should be taken on himself by each member of organized medicine in the State, and should be done immediately. The State of Louisiana has for some years enjoyed a model practice act, an act which has been invariably complimented by thinking legislators as well as medical men all over the country. It would bring tremendous harm to the inhabitants of this State of Louisiana, who are so well protected by this splendid act, were it to be disemboweled at the instance of a cult which represents only its peculiar ideas and has its own remarkably misinformed beliefs; success will be followed by the endeavors of some eighty odd other

cults in this country to attempt in Louisiana to practice their business—it is not a profession in which they are engaged but an out-and -out occupation practiced solely for financial gain. With an influx of these cults whose beliefs are based on absolutely no scientific standard, the people of Louisiana would be subjected to the care and treatment of men untaught, uninformed and ignorant of the very basic principles of anatomy, physiology and pathology, who have received no training to speak of except perhaps a few months in a correspondence school. The very idea of such a happening is repugnant to the medical man with his altruistic spirit and his desire to prevent damage and injury to credulous people who because of ignorance of medical science can readily be proselyted by the sophistry, hypocrisy, and the snivelling cant of these cultists.

1928 DUES PAYABLE NOW.

We wish to call attention of the members of the Louisiana State Medical Society to the fact that dues for the current year are payable in advance; that is, 1928 dues should have been in the hands of the State Treasurer before January 1st, 1928. It is important that this provision of the by-laws be carried out for several reasons, one of which is the matter of medical protection by the State Society. For instance, Dr. A has his dues paid by January 1st and Dr. B gets his in by January 3rd, and they perform an operation on January 2nd, as an outcome of which a malpractice suit is filed, Dr. A will be defended by the State Society whereas Dr. B will not have protection. This is such a small matter that it is well to bear in mind and see that your dues are in in ample time; thereby affording the State Secretary an opportunity of getting up his roster early in the year.

For those who have not attended to this important matter as yet, we would say

DO IT NOW.

A Study of the Course of Rheumatic Heart Disease.—In this study of the course of 160 cases of rheumatic heart disease, it was disclosed that at the time of examination at the Mayo Clinic 81 per cent of the patients were less than fifty years of age. The disease occurred most commonly in the fifth decade, forty-seven cases (29 per cent). Only seventeen patients (19 per cent) were more than fifty. The sex incidence was equal, and no striking differences were found in a comparison of the data divided on the basis of sex. The first attack occurred before the age of thirty in 136 cases (85 per cent) and before the age of twenty in 103 cases (64 per cent). The primary infection occurred in only five cases (3 per cent) after the fortieth year. The average age at the time of death was thirty-two years.

The cases were divided into three groups for comparative study according to the clinical diagnosis of valvular involvement. In Group I with mitral involvement there were 124 cases, in Group II with aortic involvement twenty-one cases, and in Group III with both mitral and aortic involvement, fifteen cases. In Group I, fifty-one patients were males and seventy-three females; the first rheumatic infection occurred before the thirtieth year in 106 cases (85 per cent), and in only three cases (3 per cent) was the first attack after the fortieth year. The average age at death was thirty years. In Group II there were nineteen males and two females; rheumatic infection occurred before the thirtieth year in seventeen cases (81 per cent); the average age at death was forty-three years. In Group III there were ten males and five females; in thirteen (86 per cent) the initial rheumatic infection occurred before the thirtieth year; the average age at death was thirty-two years. Recurrent rheumatic infections were most prevalent in the first decade of life in which they occurred in sixteen cases (55 per cent). The greatest number of attacks in any one case was eight. There was no instance of recurrent infection after the thirtieth year. There was only one instance of recurrent infection in Group II. No constant relationship is revealed in this study between the number of attacks of rheumatic fever and the age at which death occurred. There is little difference between the incidence of recurrent infection in the two sexes. In sixty-two cases (39 per cent) there was congestive failure at the time of examination. Auricular fibrillation occurred in sixty cases (38 per cent). Death from gradual heart failure occurred in 147 cases, while sudden death occurred in eight cases. Five patients died from subacute bacterial endocarditis. Willius, F. A.: Am. Heart J., 1927, 3, 139.

TRANSACTIONS OF THE TOURO INFIRMARY STAFF

At the regular meeting of the Staff of Touro Infirmary held November 9, scientific papers reported were:

A case of sacro-coccygeal chordoma, by Dr. L. H. Levy; the report of a small epidemic of fever of undetermined origin, by Dr. I. I. Lemann; fever due to intestinal autointoxication in a case of megacolon with ulceration, by Dr. I. I. Lemann; high nitrogen retention with zero phenolsulphonhthalein excretion without uremic manifestations, by Dr. I. I. Lemann.

The case reported by Dr. Levy was that of an unusual tumor, a chordoma, there having been only about seventy cases reported in the literature. The tumor itself has never been diagnosed except at operation or postmortem examination. It is a tumor which arises from the remnants of the notochord and usually is found on the upper or lower end of this embryonal remnant,—that is, the sphenoid bone or the sacrum. The symptoms are those of pressure either intracranial or nerve pressure if below. It is a malignant tumor which is slow growing as the tissue is fully differentiated with adult cells but at times metastisizes. The case presented here was that of a man of 73 years suffering from a chronic myocarditis, endocarditis, nephritis, and a malignant tumor in the sacrococcygeal region. The operation for removal of this tumor was done only for the comfort of the patient as it was impossible for him to lie on his back in bed. The patient was not disturbed by the surgical procedure but died some ten days later from uremia.

Dr. Lanford in discussing this paper demonstrated the tumor and showed that the most striking thing about chordomas is the similarity in their general appearance to thyroid tissue having much the general appearance of a colloidal goitre, though more firm. The prognosis of these cases is always unfavorable.

The first paper presented by Dr. Lemann was the report of a small epidemic of fever of undetermined origin at the Hope Haven Asylum which occurred between June 14 and August 29. There were twelve cases in all, the average duration was five days illness, the fever ranging usually to 104 or 105 degrees. Patients also presented a general adenopathy with either a normal white blood count or a leukopenia. Some cases presented a rash on the body and some were positive with typhoid agglutination tests only in very low dilutions. Dr. Lanford definitely stated that he was sure these were not typhoid or paratyphoid. The question of Brill's disease (typhus) seemed unlikely. There was no explanation offered as to diagnosis. None of the patients seemed to be sick at any time except for the hyperpyrexia.

This report brought forth much discussion as some of these cases had been seen by Dr. Cole who also offered no explanation for the diagnosis. Dr. Eshleman also saw a few of these cases and offered the possibility of a febrile influenza without respiratory manifestations. Dr. Lanford stated that the Widal test could not be looked upon as diagnostic of typhoid fever in dilutions of 1 to 40.

In closing the discussion, Dr. Lemann showed that these cases all had an adenopathy, a characteristic sudden onset with high fever, a pseudo-crisis with secondary rise of temperature followed by a true crisis, a leukopenia and in some cases, a rash. These cases all went undiagnosed.

The next paper reported by Dr. Lemann was that of a man of 68 admitted to the hospital complaining of headache and drowsiness. At X-ray examination he was found to have a huge colon which, when filled with barium, practically filled the entire abdomen. Upon treatment of daily flushes, the daily rise in temperature which had been present, disappeared. This patient died, however, sometime later of ne-

phritis with arteriosclerosis and upon autopsy the only definite finding was this enormous colon, with some ulceration of the bowel.

Dr. Eshleman in the discussion said that two things which should be thought of to explain the fever was pneumonia and some genito-urinary infection. Dr. Lemann in closing the discussion stated that the fever was apparently due to the absorption from the colon through the break in the mucous membrane as it was later controlled by irrigations.

The last case which was reported was merely to mention another patient with a zero P.S.T. test without uremic manifestations. This patient had a total non-protein nitrogen of 120 mgs., creatinin of 6 mgs., uric acid of 5 mgs. In spite of these findings the boy felt well. Sometime later he left the hospital against the advice of physicians.

Dr. Eustis pointed out in discussion that there are many nitrogenous elements in the blood which we are as yet unable to measure and which may be retained in the body even though we have a low creatinin and uric acid.

WARREN L. ROSEN, *Secretary.*

SMOKE STUDIES.

Smoke in the atmosphere, especially when combined with mist to produce fog, brings about a very great lowering of the daylight. At the present time a great loss of light results in large cities from the effect of smoke. A study of the decrease of light by smoke, now being made by the United States Public Health Service in New York City, at the lower end of Manhattan Island where the air is very smoky, showed an average loss of daylight due to smoke in January of 1927, on sunny days, of 42 per cent at 8 o'clock in the morning, and of 18 per cent at noon. These amounts of loss of daylight decreased, as the year advanced, to 33 per cent at 8 A. M., and 6 per cent at noon, in June. These figures are for clear sunny days; for foggy days, the loss is much greater. The loss of light due to smake in the atmosphere is greatest early in the morning or late in the afternoon, and least at noon. As would be expected, the loss of light is greater in the winter than in the summer. The figures given show the great importance of getting rid of smoke in our great cities. Loss of daylight or the light rays, is not the only evil resulting from the presence of smoke in the atmosphere; smoke also cuts out to a much greater extent the ultra-violet rays which are so necessary for good health.

The amount of light reaching us at different times of the day, at different times of the year, and under different conditions of weather is of interest. Illumination is measured in a unit called the foot-candle, one foot-candle being the illumination on a surface at a distance of one foot from a standard canal. Records of daylight in Washington, D. C., have been made since July, 1924, by the United States Public Health Service. These records show that at noon on a bright day in midsummer the illumination seldom exceeds ten thousand foot-candles. In midwinter at noon on a bright day it seldom exceeds 3,500 foot-candles. The difference in illumination on sunny and cloudy days is illustrated by the average illumination for such days in December, 1924, and in June, 1925. In December the average illumination on cloudy days was found to be about 23 per cent of that on sunny days. In June this ratio was about 26 per cent. Great variations in daylight take place when small clouds pass over the face of the sun on a clear day. In such cases the light may fall from 9,000, or more, foot-candles to 3,000, or less, in one minute's time, and return to the original amount during the succeeding minute.

Large increases of light may be produced by the reflection of light from banks of white clouds to the north of the sun, and very great decrease by the heavy clouds of thunderstorms.

Sunlight is of great interest and importance, since work in the office, shop, schoolroom or on the farm is performed under it; and the preservation of eyesight, the general health, and the prevention of accidents, throughout childhood and adult life, are largely dependent upon having plenty of sunlight both inside and outside the buildings in which we live and work.—U. S. Public Health Service—Health News.

TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

During the past month the Board of Directors has held its regular meeting, and the Society has held one Scientific Meeting and two special meetings. At the Scientific Meeting papers were read and discussed as follows:

"Quinidin Sulphate in Heart Disease," by Dr. Henry Bayon.

Discussed by Drs. A. E. Fossier, J. H. Musser, Randolph Lyons, George Herrmann, and closed by Dr. Bayon.

"Observations Upon the Value of Certain Diuretics in Cardiac Edema," by Dr. Randolph Lyons.

Discussed by Drs. J. H. Musser, Warren L. Rosen, George R. Herrmann, I. M. Gage, and closed by Dr. Lyons.

"Post-Operative Treatment: Some Personal Impressions," by Dr. J. D. Rives.

Discussed by Drs. I. M. Gage, O. C. Cassegrain, Alton Ochsner, Marcy J. Lyons, and closed by Dr. Rives.

The second Stanford E. Chaille Memorial Oration was held on Tuesday, December 6. Dr. M. G. Seelig of St. Louis, an internationally known medical historian and Professor of Clinical Surgery at Washington University School of Medicine, was the annual orator, the subject of his oration was "The Rise of Medicine."

During the week of December 5th to 10th "Longer Life Week" was held in this city. "Longer Life Week" was the contemplated Periodic Health Examination Week, and during these days the Mayor of New Orleans issued a proclamation setting aside this particular time. The large electric sign broadcast to thousands the message, "A City's Health Is a City's Wealth." Longer Life Week, December 5-10, 1927. Numerous placards were displayed in the various show windows on Canal street, and banners were hung at the various hospitals of the city proclaiming this week. Slides and film reels were shown in all of the large and suburban movie houses. All of the business clubs in the city were addressed by various speakers, as were practically all of the higher parochial and public schools, together with the Universities and Colleges. The following members spoke at the places designated:

Dr. Frank R. Gomila—Warren Easton Boys' High School.

Dr. P. B. Salatich—John McDonogh Girls' High School.

Dr. J. E. Isaacson—Sophie B. Wright Girls' High School

Dr. Walter J. Otis—Peters School of Commerce.

Dr. C. V. Unsworth—Kohn School of Commerce.

Dr. W. P. D. Tilly—Nicholls Industrial School.

Dr. Chas. Chassaignac—The Normal School.

Dr. E. H. Walet—Sacred Heart Convent.

Dr. H. Theodore Simon—Dominican Convent.

Dr. Homer Dupuy—Tulane University.

Dr. B. A. Ledbetter—Loyola University.

Dr. J. Birney Guthrie—New Orleans Co-operative Club.

Dr. J. L. Lewis—Kiwanis Club.

Dr. A. Jacoby—Lions Club.

Dr. J. H. Musser—Young Men's Business Club.

Dr. P. T. Talbot—Members Council, Association of Commerce.

Dr. Jerome E. Landry—Lumberman's Club.

A more detailed report of this, the first Periodic Health Examination Week, conducted by this Society, will be given at a later date in the report of the Chairman of this Committee, Dr. Paul J. Gelpi.

"There was no contest for officers for the ensuing year. The election was held Dec. 27, 1927." The following is a list of officers for the ensuing year:

President—Dr. J. Birney Guthrie.

First Vice-President—Dr. C. Grenes Cole.

Second Vice-President—Dr. W. D. Phillips.

Third Vice-President—Dr. Frederick L. Fenno.

Secretary—Dr. H. Theodore Simon.

Treasurer—Dr. John A. Lanford.

Librarian—Dr. Daniel N. Silverman.

Additional Members Board of Directors

Dr. Frank Chetta.

Dr. A. E. Fossier.

Dr. Adolph Jacobs.

The group insurance is now in effect, the Master Policy and the individual policies are at

the office of the Secretary and will be delivered to the individual members upon payment of the first quarterly premium.

The Matas Banquet was held Tuesday, December 6, at the Chess, Checkers and Whist Club. At this banquet the program was as follows:

"Dr. Matas—His Influence on the Medical Profession of New Orleans." Dr. A. E. Fossier, President, Orleans Parish Medical Society.

"Dr. Matas—His Early Career." Dr. Chas. Chassaignac, Superintendent, Eye, Ear, Nose and Throat Hospital.

"Dr. Matas—"His Professional Career." Dr. C. C. Bass, Dean, School of Medicine, Tulane University of Louisiana.

Response—Dr. Rudolph Matas.

The Delegates and Alternates to the Louisiana State Medical Society, elected at the last meeting in November for two years, were as follows:

Delegates—Dr. John A. Lanford, Dr. W. H. Seemann, Dr. R. B. Harrison, Dr. D. N. Silverman, Dr. Chaille Jamison, Dr. Fred L. Fenno, Dr. M. T. Van Studdiford, Dr. J. C. Cole, Dr. W. H. Harris, Dr. E. L. Leckert.

Alternates—Dr. C. V. Unsworth, Dr. Homer Dupuy, Dr. Jerome E. Landry, Dr. B. A. Ledbetter, Dr. A. E. Fossier, Dr. Chas. Chassaignac, Dr. O. C. Cassegrain, Dr. John Signorelli, Dr. Paul J. Gelpi.

The Secretary regrets to report the death of Dr. C. A. Adolph, an Associate Member.

The following doctors were elected to membership:

Active Members—Dr. Gilbert C. Anderson, Dr. Bernard G. Efron, Dr. Alton Ochsner, Dr. Elias Weiner.

Interne Member—Dr. Carl A. Weiss.

REPORT OF TREASURER.

Actual Book Balance, 10/31/27	$ 349.74
Receipts during November	233.05
Receipts on Insurance	1,767.63
	$2,350.42
Expenditures	403.44
Actual Book Balance	$1,946.98

The membership of the Society to date is 495.

REPORT OF LIBRARIAN.

24 books have been added to the library during November. Of these 13 were received from the New Orleans Medical and Surgical Journal, and 11 by gift. A list of new titles of recent date is appended. Gifts have been received from Tulane University, Columbia University, Dr. I. L. Robbins, Dr. Allan Eustis, and Dr. Haidee Weeks.

Four Bibliographies have been prepared on subjects as follows:

Endocrines in Gynecology.

Etiology of Arthritis other than Focal Infection.

Blood pictures in Arsenic Poisoning.

Hair ball of the stomach.

New Books.

Sinclair—Thomas Splint, 1927.
Hertzler—Minor Surgery, 1927.
Whitman—Orthopedic Surgery, 1927.
Mayo Clinic—Collected papers, 1926.
Behrend—Surgical Diseases of the Gallbladder, 1927.
Lucas—Modern Practice of Pediatrics, 1927.
DeLee—Yearbook of Obstetrics, 1927.
Stewart—Intracranial Tumors, 1927.
Herrmann—Clinical Case Taking, 1927.
Lewis—Textbook of Histology, 1927.
Wadsworth Standard Methods, 1927.
Meara—Treatment of Infectious Diseases, 1921.
Osler—Modern Medicine, v. 4, 1927.
U. S. Public Health Reports, v. 42, pt. 1, 1927.

H. THEODORE SIMON, M. D.,
Secretary.

The Specialties and Medical Education—There can be no doubt about the current trend of medical graduates to go into the specialties. Recent studies have shown that approximately forty per cent of recent graduates limit their practice to a specialty and that about one-half of these specialists have had no period of general training beyond the regular medical course and interneship. It cannot be claimed with qualification that specialization is undesirable, for no small part of medical progress and of the best type of medical practice can be credited to the efforts of specialists who are trained broadly and who work in co-operation with other well trained physicians to insure a well rounded medical service to the individual and to the community.—W. C. Rappleye, M. D., Bost. Med. & Surg. Jour., 197:548, 1927.

LOUISIANA STATE MEDICAL SOCIETY NEWS

H. Theodore Simon, M. D., Associate Editor.

BE CAREFUL HOW YOU VOTE.

It is becoming more and more important for medical men to take an interest in public affairs, which includes, of course, State politics. It is essential for the interest of the public whose welfare we always have at heart that we should vote for only those men who will definitely promise to consult with regular members of our profession before passing upon matters of public health and medical practice, provided they are elected to their State governing bodies.

Thanks to the efforts of our State Board of Medical Examiners and our State Committee on Public Policy and Legislation, the admission of cults to our State has been kept to a minimum. In this respect Louisiana is looked upon with envious eyes by medical examining boards in many other States which have not been so successful. It behooves us, therefore, to heed the warning of our able Chairman of the Committee on Public Policy and Legislation and thoroughly canvass all candidates for the Legislature, getting a definite committment from them before we pass them as worthy of our support; all those who will not promise should not be voted for by us or our friends. The same thing applies to the candidates for Governor, and we should make sure that the man we are supporting really has the interest of organized medicine(and therefore the public welfare) at heart.

The Journal takes this means of calling this matter to the attention of the local societies, presidents and secretaries, and urges them to attend to this important matter at once if they have not yet done so. A. A. H.

COMMITTEE ON PUBLICITY.

The President has announced that the following composes the Sub-Committee of the General Committee on Publicity of the State Society, said sub-committee being appointed at the instance of the General Committe, namely Dr. C. C. Bass, Chairman; Dr. H. Theodore Simon and Dr. W. Marvyn Johnson. This Committee is to organize and draft suggestions for the General Committee to pass upon at a meeting to be called in the early spring or as soon as the sub-committee is ready to report.

TO THE MEMBERS OF THE LOUISIANA STATE MEDICAL SOCIETY:

Remember that the Louisiana State Medical Society holds its session in the city of Baton Rouge from April 9 to 12, 1928. This is the season in which new budgets are being prepared for the coming year and do not forget to enter the meeting of the Louisiana State Medical Society in your budget of events for 1928. Begin now to prepare for it.

This meeting will occur just as the gloomy winter season will be over and all nature will be flaunting her spring clothes of new green woods and meadow, bursting buds and new flowers. Beautiful birds will warble their glad anthems of praise and delight at the advent of the spring season. Just think of a trip in your car, for yourself, your wife and children, through all this natural beauty, over splendid trunk lines and State Highway gravel roads which connect the Capitol with the remotest community in the state. On the contrary, if you are "fed up" on running your own car and want to come by rail, remember that there are thirty passenger trains in and out of Baton Rouge daily. Certainly enough to accommodate every body.

The location of many State Institutions should contribute to your desire to see Baton Rouge. Every citizen of the state should feel that he or she has a vested interest in the State Capitol and the Great Louisiana State University. They are yours—come and have a look-in at your property—look and grow proud that you are a Louisianian.

The great Standard Oil Plant here represents an outlay of millions of dollars and is a sight that you will not find in any other part of the country. To see the operation of this plant is well worth a visit here for that purpose alone. We have a number of other industrial plants located here that would be of interest to visitors. We have splendid hospitals here. They are Our Lady of the Lake Sanitarium, conducted by the Franciscan Sisters and the Baton Rouge General Hospital, conducted by a Board of Directors from the Citizens of Baton Rouge. In these hospitals are daily exemplified the best traditions of modern medicine and surgery. Clinics will be arranged in these hospitals for the visiting physicians.

The State House, hotels and other public buildings afford ample room for general meetings, section meetings and commercial exhibits. There will be ample accommodations for all in our splendid hotels.

A strenuous effort is being made to have an unusually interesting program this year. Dr. T. J. Perkins, Superintendent of the East Louisiana Hospital, has made arrangements to entertain the society in that great institution one day, at which time the regular program will be carried out, just as though they were meeting that day in Baton Rouge.

We have splendid theatres, play grounds, parks, clubs and golf links, to which our visitors will be welcome. We stand with open arms, on the first highlands, coming up from South Louisiana, to welcome you to this "City of Pure Delight."

J. W. Lea, M. D.,
Chairman, Committee on Publicity.

The following is a list of the personnel of the various Sub-Committees of the Arrangement Committee for the approaching Annual Meeting of the Louisiana State Medical Society to be held in Baton Rouge, April 10, 11 and 12, 1928:

Committee on Arrangements—Dr. C. A. Weiss, Chairman; Dr. L. J. Williams, Dr. W. B. Chamberlain.

Committee on Finance—Dr. E. F. Naef, Chairman; Dr. T. J. McHugh; Dr. Wm. K. Irwin, Dr. John McKowen, Dr. R. G. McMahon.

Committee on Registration—Dr. J. M. Adams, Chairman; Dr. T. C. Paulsen, Dr. H. G. Morris.

Committee on Booths—Dr. Rufus Jackson, Chairman; Dr. W. R. Eidson, Dr. Chas. Duchein, Dr. J. H. McCaa.

Committee on Signs and Decorations—Dr. R. B. Wallace, Chairman; Dr. Harry Johnson, Dr. J. E. Lawton, Dr. T. C. Foreman.

Committee on Badges—Dr. R. P. Jones, Chairman; Dr. J. A. Caruthers, Dr. J. W. Watson, Dr. E. B. Young.

Committee on Scientific Exhibits—Dr. Cecil Lorio, Chairman; Dr. R. C. Kemp, Dr. H. W. Lee, Dr. T. B. Bird, Dr. P. H. Jones, Dr. H. T. Nicole.

Committee on Entertainment—Dr. H. Guy Riche, Chairman; Dr. E. O. Trahan, Dr. T. J. Perkins, Dr. L. I. Tyler, Dr. C. S. Miller.

Committee on Publicity—Dr. Tom Spec Jones, Chairman; Dr. S. D. Porter, Dr. J. J. Robert, Dr. H. W. A. Lee, Dr. F. O. Darby, Dr. L. G. Stirling.

Committee on Hotels—Dr. Edw. K. Hirsch, Chairman; Dr. B. King, Dr. J. W. McGehee, Dr. L. F. Lorio.

Committee on Golf—Dr. C. A. Lorio, Chairman; Dr. W. B. Singletary, Dr. R. G. McMahon, Dr. L. J. Williams, Dr. L. F. Lorio, Dr. T. C. Paulsen, Dr. R. B. Wallace.

Committee on Transportation—Dr. J. A. Tucker, Chairman; Dr. B. O. LeBlanc, Dr. L. E. Bergeron, Dr. W. H. Pipes, Dr. G. W. Sitman, Dr. Edw. Whitaker.

Dr. Chas. A. Bahn of New Orleans left the city during the early part of December for New York, where he will sail on the "Albert Balalin" for Hamburg to attend clinics in Berlin, Prag, Vienna and Budapest, finally returning from Italy about April, 1, 1928.

The Bi-Parish Medical Society met with Supt. T. J. Perkins and Staff in the East La. State Hospital. Dr. Randolph Lyons of New Orleans read a most interesting and instructive paper on "The Uses of Some of the Newer Duiretic Drugs in Cardiac Edema." Col. I. D. Wall delivered an eloquent address on "The Doctor," portraying in learned terms the doctor from ancient to modern times. Dr. Lyons and Col. Wall were elected honorary members of our Society.

Election of officers for 1928: President, Dr. E. M. Toler, Clinton; Vice-President, Dr. J. W. Lea, Jackson; Secretary-Treasurer, Dr. C. S. Miller, Jackson; Delegate, Dr. C. S. Miller, Jackson; Alternate, Dr. D. N. Brown.

In an atmosphere of goodwill and cheerfulness, surcharged with atoms of goodfellowship to the extent of irresistibility impressing one with the thought that after all there was not much wrong with this mundane sphere and that the Brotherhood of Man was not a myth—in such an atmosphere was held the regular December monthly meting of the St. Tammany Parish Medical Society in the Community Rooms at Slidell on the night of the ninth, and inasmuch as this was the annual meeting, scientific papers were dispensed with and the entire membership, including a number of distinguished visitors, participated in a round table talk ranging from medicine and kindred subjects to civic affairs.

The Society unanimously adopted a resolution expressing its goodwill and sympathy in this his hour of illness and conveying the Society's heartfelt and sincere seasonable greetings to that staunch and loyal supporter of medicine in general and this Society in particular, D. H. Mason, Editor of the St. Tammany Farmer, official journal of the Society, whose voice and columns are ever and always at the disposal of practical and scientific medicine.

The following officers were elected for the year 1928: President, F. F. Young; Vice-President, W. E. Stevenson; Secretary-Treasurer, L. R. Young; Delegate to the State Medical Society, A. G. Maylie (re-elected); Alternate, J. K. Griffith (re-elected)

To H. D. Bulloch, the retiring Secretary-Treasurer, the Society voted its keen appreciation and grateful thanks for his attentive, faithful and efficient services during his eight years tenure of office.

The Society is indebted to its Slidell members for a most timely and delicious collation, with the accent on timely, for say "fellows wasn't it an awful night (outside)?"

The next meeting, at which will take place the installation of the new officers and the annual banquet, will be held at the New Fenwick Sanitarium, Covington, on Friday, January 13, 1928, at 7:30 P. M.., when and where the President-Elect F. F. Young will be the host.

Those in attendance at the meeting were: C. F. Farmer, H. D. Bulloch, J. F. Polk, J. K. Griffith, W. R. Singleton, F. F. Young, F. F. Young, Jr., L. R. Young, R. B. Paine, A. G. Maylie; and as guests of honor A. E. Fossier, T. J. Dimitry and Lucien LeDoux of New Orleans.

The writer makes bold to state that it is his opinion that if there were more frequent meetings of a similar character, where professional courtesies, friendly dispositions and goodfellowship prevailed among the various Parish and District Medical Societies, and even the State Society, organized medicine would soon find itself elevated to its rightful and proper pinnacle surrounded by a bulwark of strength, impregnable on the defensive and all powerful in the offensive.

MEETING OF THE AMERICAN COLLEGE OF PHYSICIANS.

The Annual Clinical Session of the American College of Physicians will be held this year in New Orleans the week of March the fifth. Three sessions will be held daily, the afternoon session being devoted to clinics at the various hospitals in the city; the morning and evening sessions will be utilized for the presentation of scientific papers. A distinguished list of speakers has been secured for the meeting. These speakers include such men as Julius Bauer of Vienna, Agramonte of Havana, Allen Krause of Baltimore, Maud Slye of Chicago, Frederick Allen of New York, Arthur Herold of Shreveport, James McLester of Birmingham, Charles Minor of Asheville, Gerald Webb of Colorado Springs, Castellani of New Orleans, Barr of St. Louis, Dochez of New York, and some thirty others. Symposia will be held daily on the following subjects: Tropical diseases, tuberculosis, diabetes, infectious diseases and epilepsy. Membership in the organization is unnecessary in order to attend the meeting. A cordial invitation is extended to all medical men interested in internal medicine to attend the sessions. Last year at the Cleveland meeting nearly 1500 men registered. It is to be hoped that the South will make an equally good showing.

NOTICE.

According to the By-Laws of the Louisiana State Medical Society, dues for the fiscal year of 1928 are now due. Secretaries of the various Parish Societies should begin at once to collect the annual State dues from its members for 1928, and remit as promptly as possible to the Secretary-Treasurer at 1551 Canal street, New Orleans. Any members from unorganized parishes are requested to send in their dues direct to the Secretary-Treasurer of the State Society.

In this regard we would like to call your attention to the fact that the protection under the Medical Defense of the State Society is only covered from the time that individual dues are received by the Secretary-Treasurer of the State Society. It is therefore urgent that these dues be remitted as promptly as possible in order that one may enjoy full protection under our Medical Defense Act.

At the annual meeting of the Society of the Medical and Surgical Staff of the Charity Hospital, New Orleans, held in the Miles Amphitheatre, October 11, 1927, the following were elected to serve during 1927-28.

Dr. Jerome E. Landry, President; Dr. Lucien H. Landry, Vice-President; Dr. Lucien A. LeDoux, Secretary-Treasurer. Dr. A. E. Fossier, S. Chaille Jamison, H. W. Kostmayer, and B. A. Ledbetter, members of the Medical Advisory Committee.

THE AMERICAN BOARD OF OTOLARYNGOLOGY.

An examination was held in Detroit on September 12, during the session of the American Academy of Ophthalmology and Otolaryngology. One hundred and two applicants appeared for examination, with .107 per cent failures.

An examination was held in Memphis on November 14, preceding the session of the Southern Medical Association, with .127 per cent failures.

In the course of the past year, three hundred and sixty-nine applicants have been examined.

In 1928, examinations will be held in Minneapolis on June 11, at the session of the American Medical Association, and in St. Louis on October 15, during the meeting of the American Academy of Ophthalmology and Otolaryngology.

Prospective applicants for certificates should address the Secretary, Dr. W. P. Wherry, 1500 Medical Arts Building, Omaha, for proper application blanks.

MISSISSIPPI STATE MEDICAL ASSOCIATION NEWS

J. S. Ullman, M. D., Associate Editor.

The Vicksburg Sanitarium Staff met December 10th, 1927. The following program was given:

1. Fistula in Ano. Dr. A. Street.
2. Urethral Stricture. Dr. J. A. K. Birchett, Jr.
3. Fracture of Femur. Dr. J. A. K. Birchett, Jr.
4. Gastric Hemorrhage. Dr. L. J. Clark.
5. Lipiodol in the Diagnosis of Maxillary Sinusitis. Dr. E. H. Jones.
6. Two Cases of Tetanus Following Burns. Dr. G. M. Street.

At the meeting of the Central Medical Society on November 29th, at Jackson, Mississippi, a pediatric program was given as follows:

1. Pyloric Stenosis. Dr. D. W. Jones.
2. Poliomyelitis. Dr. N. C. Womack.
3. Infant Feeding. Dr. H. F. Garrison.

It was announced that at the next meeting election of officers for the ensuing year would be held and the annual banquet would be given.

MEDICAL DEFENSE.

The Council of the Mississippi State Medical Association calls attention to the fact that last year many applications for defense by the Association against malpractice suit had to be turned down by the Council because the cases were settled before the Council was consulted. The by-laws state that the Council must be consulted in advance and given an opportunity to pass on the merits of the case. The reasons for this are obvious.

The following case is recited as a model procedure:

Dr. A was called upon by a certain attorney noted for his unscrupulous shrewdness and was told that a woman had engaged the said attorney to prosecute a suit for malpractice against Dr. A. It was intimated that for a "reasonable sum" the case could be "hushed up." The doctor spurned this suggestion. The suit was filed.

Dr. A therefore consulted the Secretary of his local society who certified to his good standing. A meeting of the Medico-legal Committee of the local society was promptly called and at once approved the defense of this case. The papers were then sent immediately to the Executive Committee of the Council and in three days' time the approval of the Council had been secured for the defense of this case.

In the meantime, Dr. A, accompanied by his Councillor, called on a lawyer of his own selection, who was asked to take the defense of this case, but on the advice of the Councillor, because this lawyer's charges seemed exorbitant, another lawyer equally competent was consulted. He agreed to take the case for a fixed fee and one that seemed more reasonable to the doctor and Councillor.

Further efforts were made by the plaintiff's attorney to effect a compromise but these were promptly rejected. It was considered better for some of these cases to go on trial for the moral effect on the community and as an example to the shyster lawyer.

This case resulted in a clean-cut victory for Dr. A and the Medical Association.

Dr. J. C. Rush, Waynesboro, has been appointed Health Officer of Wayne County in place of Dr. O. A. Lomax, deceased.

Dr. T. J. Googe, Chief of the Clarke County Health Unit, reports 40 per cent reduction in typhoid fever and 25 per cent reduction in diphtheria for 1927 as compared with 1926. In every municipality the disposal of excreta has been put on a sanitary basis. More than 5000 persons have been vaccinated against typhoid fever and upward of 2000 children have been given toxin-antitoxin against diphtheria. Physical examinations of school children have been done in all schools since the work was started. Follow-up work among schools, with the view of encouraging correction of physical defects, teaching health habits, and outlining a better diet is part of a program planned for the first part of 1928.

The South Mississippi Medical Society met in Hattiesburg, December 8th, and elected the following officers for the year 1928:

President—Dr. H. L. McKinnon, Hattiesburg.

First Vice-President—Dr. R. H. Foster, Laurel.

Second Vice-President—Dr. H. P. Smith, New Augusta.

Secretary and Treasurer—Dr. P. E. Smith, Hattiesburg.

The program given at this meeting was as follows:

1. Pellagra. Dr. Charles Bloom, New Orleans.
2. Fractures of Pelvis and Spine. Dr. T. E. Ross, Jr., Hattiesburg.

3. Rupture of Duodenal Ulcer with Closure and Diet. Dr. L. B. Hudson, Hattiesburg.

4. Achlorhydria Gastrica. Dr. Richard Walker, Hattiesburg.

5. Facial Neuralgia Due to Impacted Teeth. Dr. Guy D. Bethea.

On December 9th the Poplarville Hospital was burned, the fire originating from the explosion of a tank. The patients were removed to the Pearl River Hospital.

The annual meeting of the Issaquena-Sharkey-Warren County Medical Society was held at the Y. M. C. A., Vicksburg, on the evening of December 13th, with 58 in attendance. The scientific program included:

Calculus of the Kidney and Ureter. Dr. Joseph Hume, New Orleans.

The Physician's Responsibility in Carcinoma of the Cervix Uteri. Dr. C. Jeff Miller, New Orleans.

Paranasal Sinusitis—Its Prevention. Dr. John Shea, Memphis.

Dr. Edley H. Jones of Vicksburg, President of the Society, gave the address of welcome and introduced Dr. John Darrington, President of the State Medical Association, who brought greetings to the Society and outlined the duties of the physicians of the State to the State Association.

Dr. Felix J. Underwood, Executive Officer of the State Board of Health, spoke as the representative of that body. Dr. Dudley W. Jones, Councillor of the Fifth District, congratulated the Society on the progress of the year and extended an invitation to the annual meeting of the Central Medical Society. Dr. William G. Gill, Councillor of the Sixth District, extended an invitation to the annual meeting of the East Mississippi Medical Society.

Officers for the year 1928 were elected as follows:

President—Dr. W. H. Scudder, Mayersville.

Vice-Presidents—

Issaquena: Dr. J. B. Benton, Valley Park.

Sharkey: Dr. W. C. Pool, Cary.

Warren: Dr. L. J. Clark, Vicksburg.

Secretary and Treasurer—Dr. L. S. Lippincott, Vicksburg.

Delegates to State Association—

Issaquena: Dr. J. B. Benton, Valley Park.

Sharkey: Dr. A. K. Barrier, Rolling Fork.

Warren: Dr. L. S. Lippincott, Vicksburg.

Board of Censors—Dr. E. F. Howard, Vicksburg, for one year; Dr. W. C. Pool, Cary, for two years; and Dr. W. H. Parsons, Vicksburg, for three years.

For long and distinguished service to organized medicine in this state, Dr. H. H. Haralson of Vicksburg was elected to life membership.

The Society adopted a resolution thanking and endorsing the action of the Attorney General of the State for his splendid interest in the Redmon case at Collins, Covington County, and for his reported statement that he was ready to go after any case of violation of the law as regards medical practice.

PUBLIC HEALTH ACTIVITIES IN THE FLOODED AREA OF MISSISSIPPI.

The State Board of Health has published a most creditable report upon its activities in the Counties of Sharkey, Washington, Humphreys and Issaquena which were totally inundated as well as those that were partially inundated: Yazoo, Sunflower, Bolivar, Holmes, Leflore, and Warren. There was a total acreage of 1,966,943 in which there was an estimated population affected of 131,193. Seven municipal water supplies were cared for and more than 20,000 wells out of 24,000 affected by the flood were disinfected.

These figures will give some idea of the scale on which the State Board of Health was working. The public generally is familiar with the excellent anti-malarial and anti-pellagra accomplishments of the State Board as well as its work of vaccination and immunization.

It must be very gratifying to the profession of this state to know that its organization was not found wanting when suddenly brought face to face with this great problem. The manner of its accomplishments testifies most eloquently to the efficiency of the State Board of Health.

THE ORGANIZATION AND SUPERVISION OF COUNTY HEALTH DEPARTMENTS.

Through the co-operation of the U. S. Public Health Service and the Rockefeller Foundation in pooling funds with State and County funds, a well organized full-time county health department has been brought about in each of the formerly flooded counties in the state. The routine activities of the full-time health department include general sanitation, rural and urban; inspection of dairies and food establishments; physical inspection of school children; the control of communicable diseases; organizing and conducting of infant welfare, preschool and prenatal clinics; supervision and training of midwives, and the conducting of general educational campaigns per-

taining to prevention of disease and the promotion of public health. The personnel and the total budgets of the respective whole-time county health departments in the flooded area are as follows:

County	Annual Appropriation	Health Officer	Public Health Nurse	Sanitary Inspectors	Clerks	Laboratory Technicians
Yazoo	14,100	1	1	2	1	
Sharkey	8,000	1	1	1		
Washington	8,120	1	1	1		
Sunflower	12,500	1	1	1	1	
Humphreys	10,000	1	1	1	1	
Bolivar	13,750	1	1	1		1
Holmes	10,000	1	1	1	1	
Issaquena	7,650	1	1	1		
Warren	16,250	1	1	2	1	
Laflore	13,600	1	3	2	1	

THE PREVALENCE OF COMMUNICABLE DISEASES.

The four diseases which in previous years have been endemic in the flooded area of Mississippi and have been of major importance are typhoid fever, dysentery, pellagra, and malaria. During the six months beginning with April 1st, and ending with September 30, there has been a decrease of 37 per cent in the prevalence of typhoid in the same area during 1926. Pellagra in the flooded area has increased 109 per cent during 1927 over the prevalence of pellagra in the same area during 1926. Dysentery shows an increase of 41 per cent in 1927 over the prevalence in 1926, and malaria shows an increase of 25 per cent in 1927 in the flooded area over the prevalence in 1926.

In view of the fact that a prediction was made by the State Sanitary Engineer in charge of Malaria Control a year ago that malaria would increase throughout the State in 1927, it is interesting to note that at this time the increase in the flooded area is no greater and in some instances not so great as the increase in malaria in other counties of Mississippi which were not flooded.

At the writing of this report the total personnel for all recently organized health departments in each of the flooded counties of the state are on duty with the exception of the permanent health officer for Yazoo county. In Yazoo county a regular officer of the United States Public Health Service is acting as county health officer until the vacancy can be filled.

Total Population, White Population and Colored Population of Flooded Counties in Mississippi—1920 Census Figures Used.

County	Total Population	White Population	Colored Population
Yazoo	37,149	10,519	26,630
Sharkey	14,190	2,392	11,798
Washington	51,092	9,406	41,686
Sunflower	46,374	11,917	34,457
Humphreys	19,192	3,410	15,782
Bolivar	57,669	10,049	47,620
Holmes	34,512	7,879	26,632
Laflore	37,356	8,168	29,188
Issaquena	7,618	702	6,916
Total	305,152	64,442	240,710

The Women's Auxiliary to the Harrison-Stone Counties Medical Society met in regular bimonthly session on December 7 in Gulfport, with Mesdames M. H. Yeaman, J. S. Laird and Isham Kimball as hostesses. The president, Mrs. J. A. McDevitt, presided.

The Secretary presented the program for suggested work for the coming year, as follows:

1. Work for "full time" health organization through your own auxiliary.

2. Study health laws and work for their enforcement, (especially rabies in dogs).

3. Study and work for the control of communicable diseases under direction of the State Health Department.

4. Have "Hygeia" in all schools and public libraries.

5. Stand ready as an organization to answer any call from your medical association.

The program of the November meeting of the Jackson County Medical Society was "Infection of the Paranasal Sinuses," by Dr. McWilliams of Gulfport.

At its December meeting a moving picture, "How Biologicals Are Made," was given by Dr. Wilson of Parke, Davis & Co.

At this meeting the following officers were elected for the ensuing year:

President—Dr. J. N. Rape, Moss Point.

Vice-President—Dr. S. B. McIlwain.

Secretary—Dr. J. N. Lockard, Pascagoula.

Delegate—Dr. J. N. Rape, Moss Point.

DIED: Charles William Bufkin, Hattiesburg, Mississippi; University of Alabama School of Medicine, Tuscaloosa, 1880; formerly a druggist; aged 72; died Oct. 13, of asthma.

DIED: Thomas Jenry Safley, Drew, Mississippi; Medical Department of the Tulane University of Louisiana, New Orleans; aged 51; died October 5, of peritonitis.

DIED: William Eason Peek, Morton, Mississippi; University of Tennessee College of Medicine, Memphis, Tennessee, 1893; aged 52; died, October 14, of cerebral hemorrhage.

THE NEED OF A PREVENTORIUM IN MISSISSIPPI.

With the broadening of our program of intensive case finding from the searching out and splendid care of persons suffering from tuberculosis in an active form to include methods of prevention, the need for an institution to provide treatment and care of children with early tuberculosis infection has become increasingly apparent. For the lack of a better name, this type of institution is called a Preventorium. It may be conducted as a Summer Open Air Camp or Health Camp, but it should by all means be conducted all the year. The results of treatment in such institutions are nothing less than astonishing.

Mississippi is pitifully in need of such facilities. A Preventorium of from forty to sixty beds would be a life saving station of untold value to the lives and happiness of our people. A Preventorium is not a hospital or sanatorium for the treatment of children suffering from tuberculosis in active form. The place for such children is in the children's unit in the Tuberculosis Sanatorium.

The Preventorium provides for children who are definitely malnourished and infected with tuberculosis, but as yet not suffering from active disease. Its work is preventive rather than curative. The Preventorium should for many good and sufficient reasons be a part of the Tuberculosis Sanatorium. It should be built on the grounds of the Sanatorium yet somewhat apart for it is not deemed best to have the kiddies closely associated with open cases of tuberculosis notwithstanding the fact that they would be much safer in many instances under such conditions than at home. The Preventorium should be a part of and under the management of the Sanatorium.

Paroxysmal Ventricular Tachycardia—There are clinical criteria that enable one to make a beside diagnosis of paroxysmal ventricular tachycardia. These are slight irregularities in the rapid heart rhythm which otherwise appears quite regular, a changing quality and intensity of the first heart sound as heard at the apex, and the failure to slow the heart by vagal stimulation. This condition previously has been considered unrecognizable except by the use of electrocardiograms. There are instances where the differentiation between this condition and paroxysmal auricular tachycardia is of great importance.—Levine, S. A.: Am. Heart J., 3:177, 1927.

The Bright Oration: Richard Bright.—The most —indeed to every man who has the right spirit, life would be unendurable did it not hold for him some engrossing task to accomplish which he is striving in the midst of the routine of existence, some problem he seeks to solve, some research he is endeavoring to carry out. With many a man life slips by, and, in the end, it may seem to have been a vain effort; but after all, 'twas that effort, that hope that held him up, that brought out the best that was in him.

Without this inquiring spirit no one can go far. Spurred by it the superior man may find the school of practice less alluring, perhaps, at the outset, than the chance to devote himself uninterruptedly to the study of some concrete scientific problem; but he will find it no less broadening and no less repaying in the end, and quite as full today, as it was in the day of Laennec and Bright, of opportunities for enduring contributions to science and to humanity.

This spirit Bright carried with him throughout his career. He could not have been called a brilliant man. He made at first no great impression on those about him. But brilliancy is often ephemeral; very often brilliancy spells instability. Bright showed a steadfastness of purpose and an equanimity that are rarer and more precious than mere brilliancy. He was a simple, straightforward, kindly man who met life with charity and tolerance and serenity; a conscientious, painstaking physician; a patient, modest, scrupulous, time-taking, thoughtful student. He became a learned and a wise man, and the fruits of his labors earned him a well-merited and an honorable immortality. —Thayer, W. S.: Guy's Hospital Reports, 77, 297, 1927.

BOOK REVIEWS

Modern Medicine: Ed. by Sir William Osler, Bart, M. D., F. R. S. 3rd ed., rev. by Thomas McCrae, M. D. Philadelphia, Lea & Febiger. 1927. 1011 pp.

A very excellent volume devoted to Diseases of the Respiratory System and Diseases of the Circulatory System.

The subject matter of this volume is very important and is presented in a full, concise and at the same time a readily understandable manner. Each contributor seems to have tried to present his subject in as practicable and as full a manner as possible. The chapters devoted to Disease of the Myocardium and to Endocarditis have presented these difficult subjects in a particularly clear manner.

In the section devoted to Diseases of the Respiratory System, it is interesting to note that more space has been devoted to the Physiology of the Respiratory System and that the chapter on Asthma is preceded by a discussion of the "Phenomena of Hypersensitiveness," both useful additions.

This volume not only makes interesting reading but should prove a useful addition to any library.

J. HOLMES SMITH, JR., M. D.

Cultivating the Child's Appetite: Charles Anderson Aldrich, M. D. New York, The Macmillan Co. 1927. pp. 127.

A fascinating booklet of a hundred odd pages, written by an experienced man who does not hesitate to present his personal views on the matter. He makes a distinction between hunger and appetite, and on this distinction builds up quite a tenable theory which he proves by results in his practice. Forced feedings, calories, cajoling, etc., are given secondary or very remote places, while efforts to stimulate the hunger sensation and appeals to the mind to stimulate appetite, are given primary places in his scheme.

The book is rich in valuable hints. A complete exposition of the matter is tersely presented on pages 108 and 109. The book will be found very handy by the doctor and the parent.

NARCISSE THIBERGE, M .D.

Pioneer Medicine in Western Pennsylvania: By Theodore Diller, M. D. New York. Paul B. Hoeber, Inc. 1927. pp. 230.

Readers of Annals of Medical History are doubtlessly familiar with Dr. Diller's articles, which have been augmented and combined into an attractive volume. It fills another link in the incomplete knowledge of our own medical history, and as such should serve as a valuable source book to the cognoscenti who are interested in its details.

Naturally one would not expect great interest in this volume outside of its native surroundings. Moreover, it is composed largely of somewhat encyclopedic biographical details on little known figures. The chapters on "Three Parson Physicians," and "Early Medical Practice in Pittsburg,' are of some interest.

Such a study as this should serve as a stimulus to medical historians throughout the country to reveal the story of medicine in their own provinces, especially here in Louisiana, whose fascinating medical romance lies yet unwritten.

M. MALLOWITZ, M. D.

Anatomical, Phylogenetical and Clinical Studies on the Central System: By B. Brouwer. Baltimore, Williams & Wilkins Company. 1927. pp. 67.

The contents of this publication is the Herter Lecture made possible by Dr. and Mrs. Christian A. Herter of New York and given under the auspices of the Johns Hopkins University.

The subject treated opens up a new scientific field in the realm of neuropathology and neurophysiology inasmuch as the lecturer localizes certain tracts of the retina in the brain, likewise some illuminating data on the pathology of sensibility.

In the former he gives descriptive detail with photographs after Overbosch. In discussing the latter he explains the sympathic innervations in their entirety, giving photographs and diagrams of these. Especially does he elaborate on spinal cord tumors in the localization of which lipiodol is used.

In the third lecture of these series he lays stress on the pathological processes in the cortex with subsequent physical changes, laying emphasis in the explanation of extension of the cortical areas in mammals.

A descriptive analysis and interpretation of his findings in sclerosis-multiplex should be interesting and should be of some aid to the neurologist in his differential diagnosis by exclusion. He cites cases in detailing the result of his research. The lectures are written as only a medical literary genius of his type could write, for the name of Brouwer is synonymous with the intellectual advances in clinical neurology. The lectures should be used by

the ophthalmologist and physiologist as well as the neuropathologist and the neuropsychiatrist as collateral reading.

W. J. Otis, M. D.

Fistula of the Anus and Rectum: By Charles John Drueck, M. D., F. A. C. S. Philadelphia, F. A. Davis Co. 1927. pp. 318.

This monograph covers the subject of fistulae fully. Besides chapters on Etiology, Symptoms, Diagnosis, Prognosis, and Treatment, there are several chapters on special types of fistulae, and a noteworthy one on The Accidents and Complications of Fistula Operations. Preparation of the patient and postoperative care are covered in detail and their importance properly emphasized. It is clearly written and the illustrations are numerous and well selected.

Maurice Lescale, M. D.

The Principles of Sanitation: By C. H. Kirby. Philadelphia, F. A. Davis Co. 1927. pp. 354.

This is a neat treatise written by a well experienced sanitarian for men employed by the community to prevent or control disease. When the author first assumed his duties as sanitary director he realized that most men appointed for this political position were men who needed more knowledge on this important branch. To insure results from all his assistants and co-operation from the public in general it was imperative that his whole department understood not only *what* was to be done to prevent the spread of diseases in the community but *why* this and that step in sanitation should be carried out.

This volume represents the course of instruction given by him to his staff, as the author could not find any book on the subject that quite answered his purpose. It is very clearly executed and richly illustrated with selected plates. Three sections are devoted to communicable diseases—the descriptions are short, to the point and only sensible and well accepted steps recommended. The fourth section is devoted to food; the part on vitamines is very valuable. The only fault which the reviewer finds is that the chapter is too short. The last section on occupational diseases is quite up to date.

Men doing health work whether medical men or laymen employed to look after the welfare of a community will find that the time spent in a careful review of this modern well-edited book is well repaid.

Narcisse Thiberge, M. D.

The Care of the Patient: By Francis Weld Peabody, M. D. Cambridge, Harvard University Press. 1927. pp. 48.

Professor Peabody's thought provoking article, originally given as one of a series of talks to students of the Harvard Medical School, and later appearing in the J. A. M. A. (Vol. 88, pp. 877-82), is now available in a format worthy of its content.

At a time when our scientific thoroughness and therapeutic nihilism are apt often to lead us afield in treating the patient, it is well to bear in mind the last statement in the essay: "One of the essential qualities of the clinician is interest in humanity, for the secret of the care of the patient is in caring for the patient."

The late lamented professor's thoughts will serve excellently in the physician's periodic brain and conscience dusting.

M. Mallowitz, M. D.

Treatment of Venereal Disease in General Practice: By E. T. Burke, D. S. Q., M. B., Ch. B. (Glas.). New York, Oxford University Press. 1927. pp. 162.

This book fills a long needed want. The reason for its publication can best be expressed in the author's own words: "While hundreds of pages are consecrated to diagnosis, treatment is summarily dismissed in a few paragraphs. The therapeutic directions are general and vague . . . one . . . can give clear, detailed and definite directions for treatment." The author, with these glaring ills always in mind, succeeds admirably in presenting a book which is at once concise and comprehensive. Throughout the book there flows a subdued though keen sense of humor and wit which proves most enjoyable entertainment at the same time a veritable mine of information and experience. In a review of this book one is tempted to forget the advice that "cautious they praise, who purpose not to sell." The chapters entitled Obita Dicta Syphilitica and Gonorrhoeocia are ingenious and witty aphorisms. The scheme of treatment mapped out for the different stages of syphilis and gonorrhea and its complications are clear cut, simple, and one is apt to remark, foolproof. There are no indefinite directions but sweeping and positive rules of procedure with sufficient latitude allowed for individual variations.

Several subjects are of such importance that they merit at least some slight mention. First he deals with the fact that there has been demonstrated a general law with regard to the members of the nitrogen family of the elements, as arsenic and bismuth. The statement is made that "they only exhibit their parasitical properties after they have been acted upon by the tissues," and he gives the supposed mode of action.

The various arsenical and bismuth preparations are analyzed and the untoward effects of each are discussed. In regard to mercury the author takes the stand that it is "as obsolete as is sarsaparilla," and asserts that he has discarded it. Only under two conditions should it be used: (1) Intolerance to arsenic and bismuth; (2) inaccessibility to these two drugs. The administration of glucose before administration of arsenic to decrease possibility of liver poisoning and jaundice merits consideration. Appendix VII, which deals with the subject "secondary organisms in gonorrhea," is a gem. The sideline, of the relationship between the laboratory and clinic, is worthy the attention of anyone regardless of his interest in the treatment of venereal disease. As this review has already grown too lengthy I will conclude with the good advice that you read it soon, especially those of us engaged in the general practice of medicine.

I. L. ROBBINS, M. D.

The Thomas Splint and Its Modification in the Treatment of Fractures: By Meurice Sinclair, C. M. G., M. B., Ch. B. (Edin.). With a foreword by Sir Robert Jones, K. B. E., C. B., F. R. C. S. London, Oxford University Press. 1927. pp. 168.

This books, a treatise on the splint which has revolutionized war surgery relative to fractures of the extremities is written by an officer of the British army. His experiences with treating the gun shot fractures in the late war has given him valuable information which literally is crowded into the brief 162 pages. There are over one hundred illustrations which makes descriptions interesting and simplified. Every physician doing any fracture or industrial surgery today should read this book and there is no doubt but that the Thomas Splint will come into universal usage.

H. THEODORE SIMON, M. D.

The Treatment of Acute Infectious Diseases: By Frank Sherman Meara, M. D., Ph. D. 2d ed. rev. New York, The Macmillan Company. 1921. pp. 806.

The text is one of the most complete of its sort on this subject. It apparently leaves little to be desired in an accurate, detailed outline and discussion of the actual practical management of acute infectious diseases. The common, as well as the rarer conditions, are included. Since such a large percentage of the general practice of medicine involves the careful handling of such cases, it is of considerable value. The author is to be congratulated upon the excellent literary style and the lucidity of his directions.

Each chapter is followed by a short summary of the salient points discussed at great length previously. Such an arrangement allows of ready reference when necessary. Because of its completeness and detail many of the measures and suggestions are too elaborate to be practical. The accepted use of scarlet fever antitoxin and the Dick Test since this revision would necessitate some correction of that chapter.

WILLARD R. WIRTH, M. D.

Treatise on Orthopaedic Surgery: By Royal Whitman, M. D., M. R. C. S., F. A. C. S. 8th ed. rev. Philadelphia, Lea & Febiger. 1927. pp. 1061.

The text-book on Orthopaedic Surgery by Royal Whitman, of New York, has always been considered one of the most valuable of its kind published. The new edition contains much additional valuable data, both in the form of the text and in the new illustrations. The subjects are carefully analyzed from all standpoints, and only sound common sense advice given in regard to diagnosis and treatment.

The book is entirely too extensive to be reviewed in a few lines. It merits a careful analysis and painstaking study for one to obtain the real value of the book. It is a text which any general practitioner, general surgeon or bone and joint surgeon should have in his library for ready reference. It is more than a reference book, however, as it goes into great detail in describing the various conditions seen in diseases involving the spine and the extremities. The illustrations are unusually clear, and offer one a quick method of obtaining an insight into almost any subject in orthopaedic surgery.

JOHN T. O'FERRALL, M. D.

Collected Papers of the Mayo Clinic and the Mayo Foundation: Ed. by Mrs. M. H. Mellish, H. Burton Logie M. D., and Charlotte E. Eigen Mann, B. A. Vol. 16. Philadelphia, W. B. Saunders. 1926. pp. 1078.

This volume as with previous volumes of Collected Papers, represents the progress of medical science during the year 1925, with particular reference to the work being accomplished by members of the Staff at the Mayo Clinic. There is no important major subject in medicine which has not been covered by one of the writers. The papers have been arranged in order to be of special benefit to the general surgeon and internist, though the fields of the various specialties have been well covered. To call attention to any particular paper or group of papers would only be expressive of an individual preference. The entire book is well worth reading and the writer most heartily recommends it to every physician. There is a total of 169 papers by 161 contributors.

SHIRLEY C. LYONS, M. D.

Minor Surgery: By Arthur E. Hertzler, M. D., F. A. C. S., and Victor E. Chesky, A. B., M. D., F. A. C. S. St. Louis, C. V. Mosby Co. 1927. pp. 568.

This volume, covering the entire field of minor surgery, must of necessity be brief.

There are several points with which the reviewer is not in accord; the pathology of carbuncle is confused with that of furuncle; the time worn crucial incision is still adhered to; no mention is made of the antitetanic treatment of erysipelas; the use of carron oil in the treatment of burns is still advocated.

The statement that "the lower extremity is subject to a variety of sprains uncommon in the hip, less so in the knee and very common in the ankle and the smaller joints of the foot," is contrary to the reviewer's experience. A sprain fracture, however, is the more frequent type of injury.

The chapter on inflammatory infections of the upper extremity is adequate, concise and clear. The many illustrations are clear and convey the desired clinical characteristics.

Purposely no reference to pathology is included as the authors had in view "wholly a practical end." As this book deals primarily with the types of cases seen in an out-patient clinic, it is of value to the student as a text and to the interne and practitioner as a source of condensed clinical information.

PAUL G. LACROIX, M. D.

PUBLICATIONS RECEIVED.

Paul B. Hoeber, New York: "Tobacco and Physical Efficiency," by Pierre Schrumpf-Pierron, M. D.

Williams & Wilkins Company, Baltimore: "Fighters of Fate," by J. Arthur Myers, M. D.

C. V. Mosby Company, St. Louis: "Diseases of the Mouth," by Sterling V. Mead, D. D. S. "Nasal Neurology Headaches and Eye Disorders," by Greenfield Sluder, M. D., F. A. C. S. "The Normal Diet," by W. D. Sansum, M. S., M. D., F. A. C. P. "Diseases of the Skin," by Henry H. Hazen, A. M., M. D.

MacMillan Company, New York: "Nerve Tracts of the Brain and Cord," by William Keiller, F. R. C. S., Ed. "Clinical Laboratory Procedures," by George L. Rohdenburg, M. D.

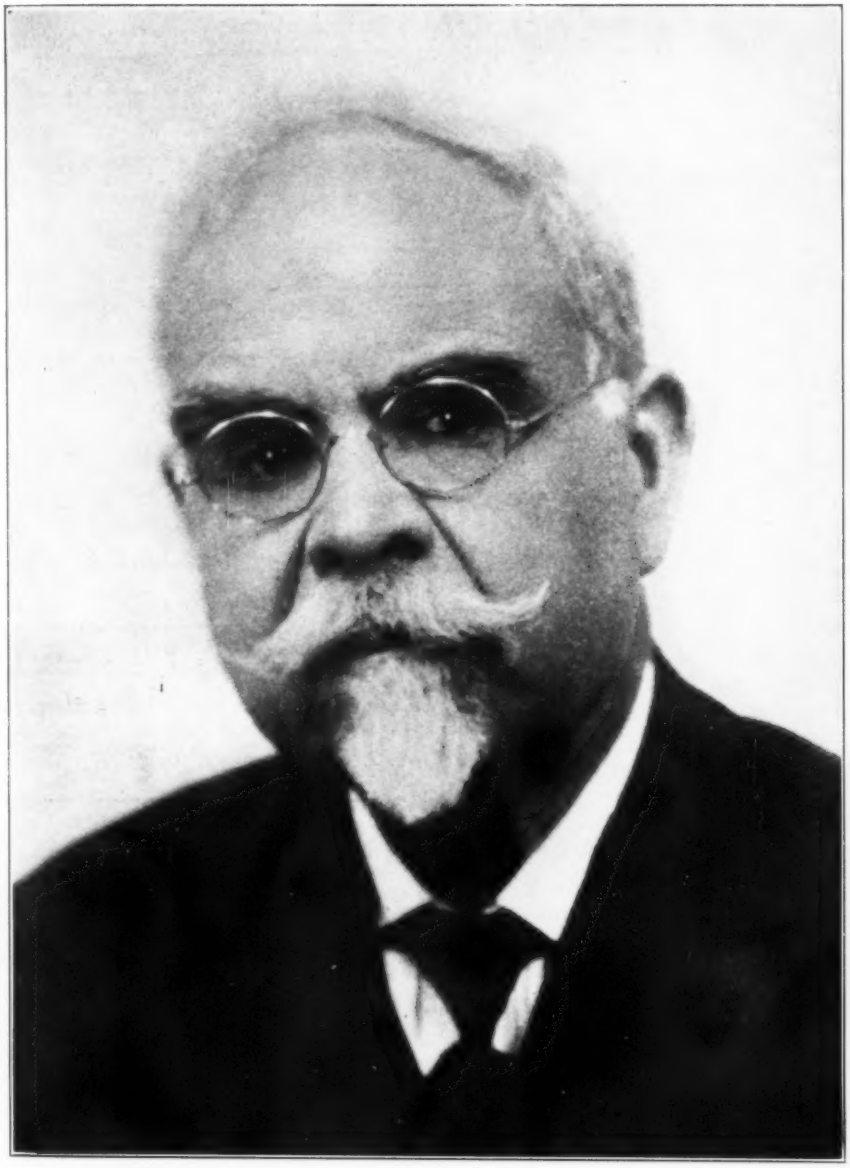
J. B. Lippincott Company, Philadelphia and London: "Radium in Gynecology," by John G. Clark, M. D., and Charles C. Norris, M. D. "International Clinics," Vol. IV, thirty-seventh series, December, 1927.

Octave Doin, Paris: "Le Metabolisme Basal," by Claude Gautier and Rene Wolff.

REPRINTS.

"Tuberculosis of the Kidney in Pregnancy," by Winfield Scott Pugh, New York City. "Perineal Prostatectomy," by Winfield Scott Pugh, New York City.

Medical Education: One of the largest problems of medicine today is the distribution of physicians. It is well recognized that there is a decline in the number of physicians in the rural districts and in the smaller communities. A few individuals are of the opinion that the elevation of standards of medical education has been largely responsible for this condition, and suggest a lowering of our standards to secure a better distribution to these rural districts. There is no evidence available which would substantiate that opinion. Current methods of communication and transportation, the shift of the population from rural communities to cities and the rapid development of industry throughout the country have markedly influenced the entire life and character of the rural districts and have made their problem a major national question—of which health and medical service are but a part. To assume that the medical aspects of this enormous question can be answered by supplying these areas with physicians with a training below standard, is a far cry even if it could be done, which is quite unlikely. Modern transportation, the development of hospital and clinic facilities and active health and nursing work in rural communities have already demonstrated, in many sections of the country, that well-trained physicians and health workers will go to these districts fully prepared to meet their peculiar problems. It probably is true that in most sections of the country better medical services are now more accessible than they have been in the past. The present problem is largely to secure better organization of existing facilities and further extension of them, rather than to provide sub-standard physicians the individual. W. C. Rappleye, M. D., Bost. Med. & Surg. Jour., 1927, 197, 548.



Rudolph Matas

New Orl. med & j Feb. 1928